Missouri EPIDEMIOLOGIST

Volume 21, Number 3 *May-June 1999*

Section for Environmental Public Health 1998 Annual Report

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Section for Environmental Public Health

The Section for Environmental Public Health (SEPH) is a new name for a group of highly diverse programs singly dedicated to protecting the health and well-being of people in Missouri from hazardous environmental contaminants and conditions. SEPH was created from the blending and strengthening of two related bureaus—Environmental Epidemiology and Community Environmental Health—into one comprehensive environmental public health unit. From food safety to childhood lead poisoning prevention, from risk and health assessment to special public health studies, SEPH's diversity is its strength and service is its mission.

The following report reflects activities and accomplishments from SEPH's first full year of service under the new organization. It should be noted, however, that this annual report does not pull from all of SEPH's various programs. There are some programs that, though they provide crucial, health protective services across the state, they would not be considered epidemiologically based under the strict definition of the term.

SEPH Risk Assessment Programs

SEPH's two risk assessment programs are heavily involved in assessing the risks that hazardous substances in the environment pose to human health. These programs work closely with other state and federal environmental and health agencies, including the U.S. Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (DNR), the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Department of Defense (DOD) and the Department of Energy (DOE). These programs assess human risk through several different kinds of documents that discuss exposure levels, safe clean-up levels and various aspects related to exposure to substances found at hazardous waste sites statewide. An EPA-funded risk assessment involves a quantitative analysis or review of information about a hazardous waste site. This kind of assessment provides a mathematical "best guess" of what will happen if the site is not cleaned up or if the site is only cleaned up to a specific level of contamination, rather than a safe (walk away) level. A state-funded risk assessment provides more generic clean-up guidelines for sites, based on similar but not identical assumptions/formulae to EPA numbers. The information given in the following two subsections reflects extensive research, cooperation, coordination, document review and interagency communication by SEPH staff. The average risk assessment may take as long as two months to complete and submit to EPA.

Risk Assessment Program (EPA)

The following activities were completed during 1998:

- Completed three site-specific human health risk assessments.
- Reviewed two site-specific ecological risk assessments.
- Developed safe residual soil levels/remediation goals for four sites.
- Reviewed one risk assessment (from another agency).
- Reviewed 25 site documents for health-related issues.
- Attended four training courses/conferences.
- Attended and/or gave presentations at six public meetings.
- Attended 19 technical site meetings.

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- Conducted seven site visits/investigations.
- Participated on the Governor's Interagency Task Force on Methamphetamines
- Worked on two projects with assessors from other agencies and/or responsible parties.
- Maintained effective communication and working relationships with numerous local, state and federal agencies and organizations.

For more information, contact the program at (800) 392-7245.

Risk Assessment Program (State)

The following activities were completed during 1998:

- Reassessed 53 abandoned or uncontrolled hazardous waste sites for their risk to public health.
- Assessed three new abandoned or uncontrolled hazardous waste sites for their risk to public health.
- Analyzed 22 sites to determine if private drinking water wells were impacted by nearby contamination.
- Continued assisting DNR by reassessing the health risks at five DOD sites. One is an active Air Force base; the other sites are inactive, but are being cleaned up for future use.
- Provided health information to DNR to assist with its Voluntary Cleanup Program. Sixty of these sites are already cleaned up, while 120 more properties are in the process of cleanup.
- Completed six clean-up assessments on sites other than abandoned or uncontrolled hazardous waste sites.
- Assisted DNR in developing a guidance document for their Brownfield Redevelopment Program.
- Provided consultative services to DNR's Air Pollution Control Program regarding acceptable ambient air levels at 25 sites.

For more information, contact the program at (800) 392-7245.

Public Health Assessment Program (ATSDR)

The Public Health Assessment Program is part of a state cooperative agreement with ATSDR to conduct health assessments in Missouri communities near hazardous waste sites. In contrast to EPA and state risk assessments, public health assessments provide a qualitative evaluation of exposures to contaminants at a site and related adverse health effects that could have occurred in the past, are presently occurring, or could occur in the future. These health effects are evaluated by estimating exposures based on interviews with citizens, community and elected leaders, etc., or based on review of documents such as site investigations, risk assessments, site histories and any other available information about a site. Findings from these assessments are reported through public health assessments and health consultations. These documents are designed to address community concerns, as well as to inform and educate the communities about sites, and help them make decisions about how to protect themselves from exposure to site-related contaminants and resulting adverse health effects. These documents also are used by environmental agencies with regulatory power (e.g., EPA) to help make the most health protective decisions when planning clean-up or remediation actions at a site.

All of these program activities represent a tremendous amount of communication, coordination and cooperation with numerous local, state and federal departments and agencies required to complete the work summarized in this report. SEPH has also been heavily involved in numerous other sites and issues which are currently in the early stages of community and governmental activity and development**.** In 1998, the Public Health Assessment Program:

- Completed two pubic health assessments.
- Completed 20 health consultations.
- Hosted or attended 11 public availability sessions.
- Visited 13 hazardous waste sites statewide.
- Coordinated one community survey.
- Participated in five Community Assistance Group meetings.
- Participated in numerous health education group meetings.
- Provided technical assistance to other agencies.

For more information, contact the program at (800) 392-7245.

Childhood Lead Poisoning Prevention Program

Childhood lead poisoning is one of the most common preventable environmental health problems in the world today. When lead is introduced into the body through ingestion or inhalation, its adverse toxic health effects on young children's developing nervous, hematopoietic and renal systems can range from acute (coma and seizures) to subtle (learning and behavioral problems or anemia). Young children (age 0–72 months) are at greatest risk due to their hand-to-mouth behaviors. Testing, treatment and prevention of access to lead hazards are key elements to finding and, ultimately, eliminating childhood lead poisoning.

Dust and debris from deteriorating lead-based paint in older housing is considered to be the primary contributor to childhood lead poisoning in the United States today. Paint with the highest lead content was used extensively before 1950. In Missouri, pre-1950 housing comprises nearly 29 percent of all housing stock. In contrast, only 27 percent of the nation's housing stock was built before 1950. Compared to other states, Missouri has the 24th highest percentage of pre-1950 housing.

Table 1. Percentage of Children Aged 1–5 With Blood Lead Levels ≥10 µg/dl by Income Level, United States, 1991–1994

Income Level	Percent of Children Aged 1–5 With Blood Lead Levels ≥10 µg/dl
Low	8.0%
Middle	1.9%
High	1.0%
All children	4.4%

Source: Centers for Disease Control and Prevention. Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials. November 1998.

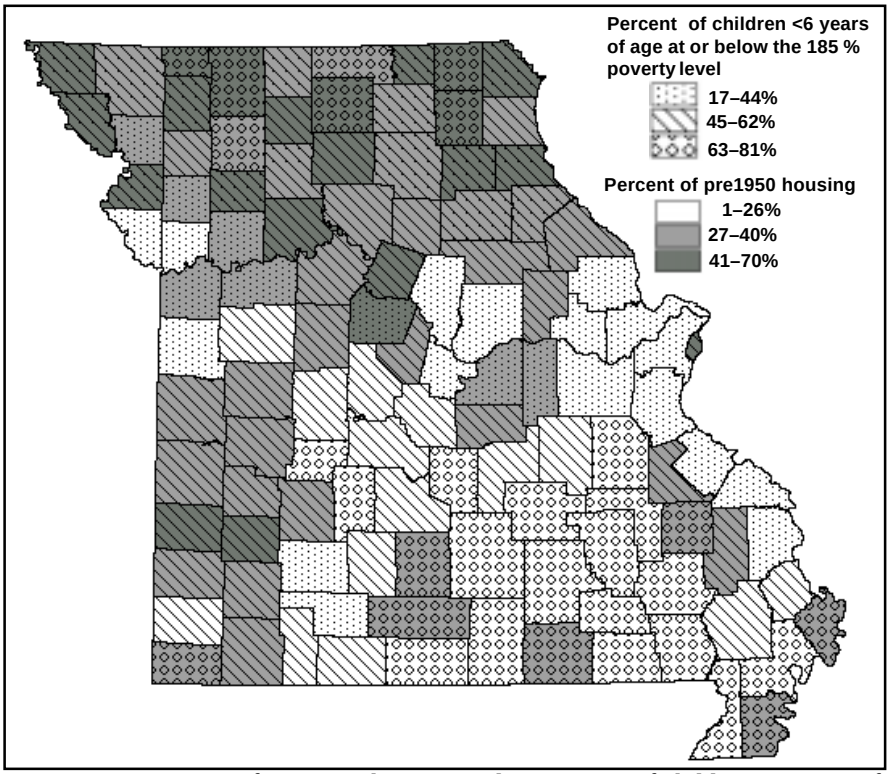

Figure 1. Percentage of pre-1950 housing and percentage of children <6 years of age at or below the 185 percent poverty level by county, Missouri, 1990.

Studies also show a strong relationship between elevated blood lead levels and income. Logically, the increased likelihood for poorer children to inhabit older, deteriorating housing would be a reasonable conjecture. The Centers for Disease Control and Prevention (CDC) data substantiate that children in lower income levels are nearly twice as likely to have elevated blood lead levels when compared to all children tested. See Table 1.

However, any remodeling activities that have the potential to disturb lead-based paint and/or its dust, regardless of a family's income, can produce lead hazards and create the potential for lead poisoning. Consequently, caregivers should be aware of these and other factors, and should assess the potential risk for lead poisoning on a case-by-case basis.

Figure 1 shows the percentage of pre-1950 housing by county in Missouri with an overlay of the percentage of children less than 6 years of age who are at or below 185 percent of the poverty level. These indicators identify many counties in Missouri that show a high potential risk for childhood lead poisoning. Analyzing smaller geographic boundaries (such as zip codes, census tracts, etc.) can also identify areas with a high potential risk for lead poisoning that the map in Figure 1 may not depict.

While Missouri has its share of older homes containing lead-based paint and poverty, the state also features areas of contaminated soil in vicinities near lead mines and smelters due to its unique role as the largest producer of lead and lead products in the United States. Other related risk factors include parents employed at lead mines or smelters and/or other lead-related occupations and hobbies.

There are also other sources of lead hazards such as (the following list is not all-inclusive):

- Improperly glazed or fired pottery and ceramic-ware that when used for food or beverage vessels can leach lead into food
- Mini-blinds
- Lead crystal
- Stained-glass making, artist's paints, crayons (imported), inorganic pigments
- Lead solder (used for welding e.g., electronics, imported food cans/containers, etc.)
- Lead-cast figurines or jewelry
- Imported candy (wrappers)
- Ammunition, batteries, fishing sinkers
- Traditional Medicines and Cosmetics including:
  - ASIAN—Chuifon tokuwan, payloo-ah, ghasard, bali goli, kandu
  - MEXICAN—azarcon and greta (also known as liga, Maria Louisa, alarcon, coral, and rueda)
  - MIDDLE EASTERN—alkohl, kohl, surma, saoot, cebagin

Reported testing in Missouri during 1998 resulted in 43,591 Missouri children less than 6 years of age screened

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for lead poisoning. This figure represents ten percent of the estimated population of children in this age group. 1998 is the second highest year of lead testing activity since the Missouri Department of Health began lead surveillance in 1995. Screening during 1998 increased by 11 percent compared to 1997 (39,402). Figure 2 on page 4 shows the ranges of lead screening activity in 1998 by county.

Of the children tested for lead poisoning during 1998, 5,342 (12.3%) were identified with blood lead elevations ≥10 µg/dl (CDC's level of concern). In comparison to 1997 figures (5,382 elevated/39,402 screened = 13.7%), this represents a 1.4 percent decline in the proportion of children testing at or above the level of concern for lead poisoning. The number of children tested and the number with elevated blood lead levels by county are available upon request from the Missouri Department of Health Childhood Lead Poisoning Prevention Program at (800) 575-9267.

A major function of the Missouri Childhood Lead Poisoning Prevention Program is to increase the number of reported blood lead screenings in order to determine the extent of lead poisoning and its location. Efforts necessary to accomplish this include educating Medicaid Managed Care plans and physicians regarding required blood lead screening during 12- and 24-month well-child visits, encouraging private laboratories to report, and increasing general public awareness through various media sources. Future efforts will continue to be focused in areas identified to have the greatest potential risk to children based on housing, poverty, screening numbers and lead occupations.

Another primary role of the Missouri Childhood Lead Poisoning Prevention Program is to identify and prevent/eliminate access to environmental lead hazards for children with blood lead levels ≥20 µg/dl. Home environmental assessments are generally conducted by a public health nurse and sanitarian (trained in lead hazard assessment). They educate the family about specific personal hygiene, such as frequent and thorough handwashing by the child, washing toys, wet mopping to remove lead dust from floors and surfaces where small children play, and good nutrition through a diet high in iron and calcium to prevent bodily absorption of lead. During 1998, 1,654 environmental assessments to detect sources of lead hazards were conducted.

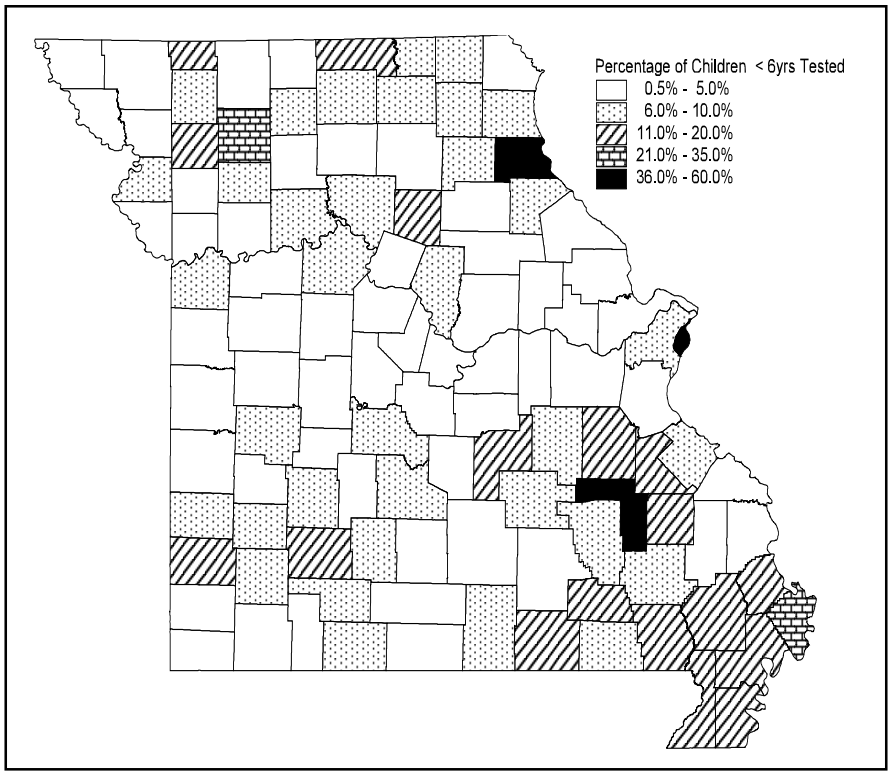

Figure 2. Ranges of childhood lead screening by county, Missouri, 1998.

Throughout the state, other lead program efforts include increasing community awareness and involvement in the efforts to eliminate and prevent childhood lead poisoning. Information concerning the level of risk for childhood lead poisoning for local needs assessments play an integral role in this process. For further information, please contact your local health department, or call the Childhood Lead Poisoning Prevention Program at at (800) 575-9267.

Environmental and Occupational Diseases and Conditions Passive Surveillance System

The section maintains this passive surveillance system to document occupational diseases and environmental health conditions which are required to be reported to the Department of Health by 19 CSR 20-20.020 and 19 CSR 20-20.080. Each year, the surveillance system receives reports on cases of environmental and occupational diseases and conditions that are entered into a database for evaluation and analysis. Cases of lead poisoning in children under 6 years of age are not included in the system because they are tracked by the state's Childhood Lead Poisoning Prevention Program described earlier in this report.

The majority of conditions reported within a given year typically are lead poisoning in adults and lead poisoning in 6 to 17-year-olds. However, final reports for lead poisoning in these two age groups were unavailable for this

annual report. Also reported to the surveillance system are acute chemical poisoning (10 cases in 1998) and carbon monoxide poisoning (31 cases in 1998).

For more information, contact the program at (800) 392-7245.

Radiological Health Program

SEPH's Radiological Health Program is responsible for overseeing and regulating sources of ionizing radiation in non-medical settings. These sources are used in many ways, for example in nuclear pharmacies and industrial radiography. The program is also involved in emergency response and environmental radiation activities. Program staff also gather sampling results from radon detectors distributed statewide through county and city health departments for testing in their areas, and provide radon information through seminars, displays and public awareness presentations. The Radon Hotline provides Missouri residents easy access to radon information. In 1998, the Radiological Health Program:

- Continued to register and reregister ionizing radiation sources used in non-medical settings:
  - 89 industrial radioactive material users
  - 118 x-ray users
- Performed periodic radiation safety surveys of industrial x-ray and radioactive material registrants.
- Participated in extensive training activities in preparation for emergency events at the Callaway and Cooper nuclear power plants. Training included drills, dress rehearsals and exercises. This year's Cooper exercise was federally evaluated and the section successfully demonstrated the capability to protect public health and safety in the event of a nuclear plant emergency event.
- Responded to four requests for assistance by scrap metal recyclers and landfill operators to locate and characterize radioactive sources.
- Continued to maintain and cultivate close working relationships with local, state and federal agencies and organizations including the Missouri Department of Natural Resources, Environmental Protection Agency, American Lung Association, Missouri Association of School Administrators and the Missouri Public Health Association. These relationships provided opportunities for information exchange, data gathering, coalition building, community outreach and funding.
- Presented 26 radon awareness programs at seminars, health fairs and other meetings.
- Provided radon detectors to county and city health departments for testing in their areas. These agencies distributed more than 1,500 detectors to the public.
- Received approximately 700 phone calls through the Radon Hotline.

For more information, contact the Radon Hotline at (800) 669-7236.

Special Studies

One of SEPH's most important functions is to coordinate and conduct special epidemiological studies that are designed to determine whether and to what extent Missourians are exposed to hazards in the environment. These studies require a tremendous amount of time, effort, coordination, planning, financial resources and personnel. A study can take up to two years or longer to complete from inception to the published final report. The following summarizes special study efforts in 1998:

Missouri Statewide Food Service Survey

The section conducted this survey during September, October and November 1998. Groundwork for the statewide survey was laid by a pilot survey conducted in January 1998 in the department's northeastern health district. The pilot, which included 100 randomly selected food service establishments, was designed to determine if the survey questionnaire and inspection protocol were viable, whether personnel conducting the survey needed additional training, whether the survey would generate useful baseline information, and to identify public health needs in Missouri's food service industry. The statewide survey involved 1,200 food service establishments across the state. Information was collected by questionnaire on the education and training of food service employees, needs for educational/training materials in languages other than English, hepatitis A vaccination levels for food service employees, length of time employed in food service, number of employees, number of meals/customers served, reasons for taking sick days, and the presence of policies and procedures. A regular inspection was conducted at the same time. Analysis of the information collected from this survey is currently being conducted. A report of survey results will be published later in 1999.

Lead Exposure Around Big River Mine Tailings Site

The section concluded this lead exposure study, funded by ATSDR, in children between the ages of 6 months and 6 years living in the area around the Big River Mine Tailings Site in St. Francois County. The study found that 17 percent of participants in the study area had elevated blood lead levels, compared to three percent in the control area. Analysis of environmental samples and questionnaire data was completed in 1996. The draft report was released to the public on May 27, 1998. The final report was released to the public in August 1998. If you have questions regarding this study or its availability, please call (800) 392-7245.

Dioxin Exposure at Times Beach

The section also continued this study to determine the exposure of area residents to emissions from the dioxin incinerator in Times Beach, Missouri. The first round of blood samples was collected in September 1995, before the incinerator began operation in March 1996. Blood samples were taken from 76

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Tuberculosis Annual Report for 1998

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Section of Vaccine-Preventable and Tuberculosis Disease Elimination

The number of reported tuberculosis cases nationwide continued to decrease in 1998. According to the Centers for Disease Control and Prevention (CDC) 18,361 cases of tuberculosis were reported in 1998, representing a 7.5 percent decrease from the 19,851 cases reported in 1997. This is the first time since national tuberculosis reporting was initiated in 1953 that the United States has had less than 19,000 cases reported during a one-year period. This represents the sixth consecutive year that tuberculosis cases have decreased nationally.

The number of reported tuberculosis cases in Missouri decreased by 25.8 percent, from 248 cases in 1997 to 184 cases in 1998. The case rate decreased from 4.7 to 3.4 per 100,000 population. See Figure 1 for trends.

The major metropolitan areas accounted for 69 percent of reported cases in Missouri during 1998. This compares to 63 percent in 1997. Rural areas accounted for 30 percent of the cases in 1998 compared to 37 percent in 1997. Three of the four major metropolitan areas experienced decreases in the number of reported cases. St. Louis City decreased from 60 to 55 cases (-8.3%), and St. Louis County decreased from 47 to 21 cases (-55.3%). In Kansas City, the number of cases remained unchanged at 39 cases. In Springfield-Greene County, the number of cases decreased from 10 to 6 cases (-40.0%). The case rates for these areas in 1998 were 16.1 per 100,000 for St. Louis City, 2.1 for St. Louis County, 8.8 for Kansas City, and 2.7 for Springfield-Greene County. See Figure 2.

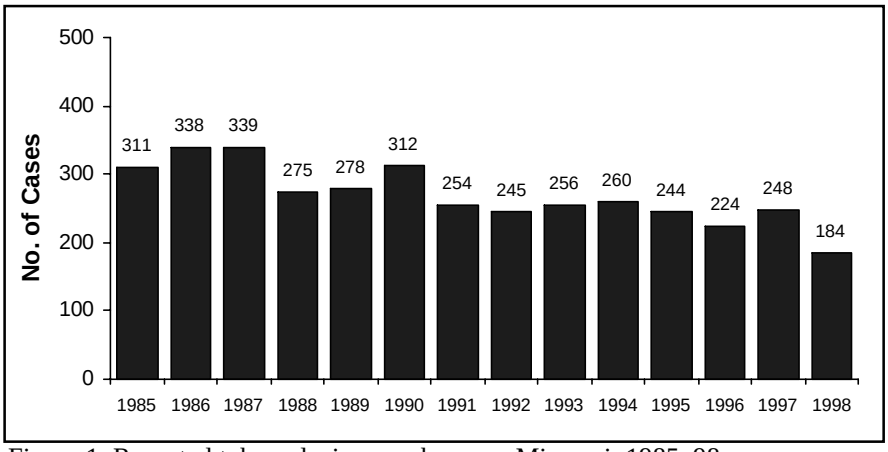

Figure 1. Reported tuberculosis cases by year, Missouri, 1985–98.

The number of reported cases in the rural areas showed a decrease of 9 percent, from 92 cases in 1997 to 56 cases in 1998. Decreases were noted in five of the six health districts. The Northwestern District decreased from 18 to 11 cases (-3.9%); the Southwestern District decreased from 15 to 14 cases (-6.7%); the Southeastern District decreased from 30 to 11 cases (-63.3%); the Central District decreased from 18 to 15 cases (-16.7%); and the Eastern

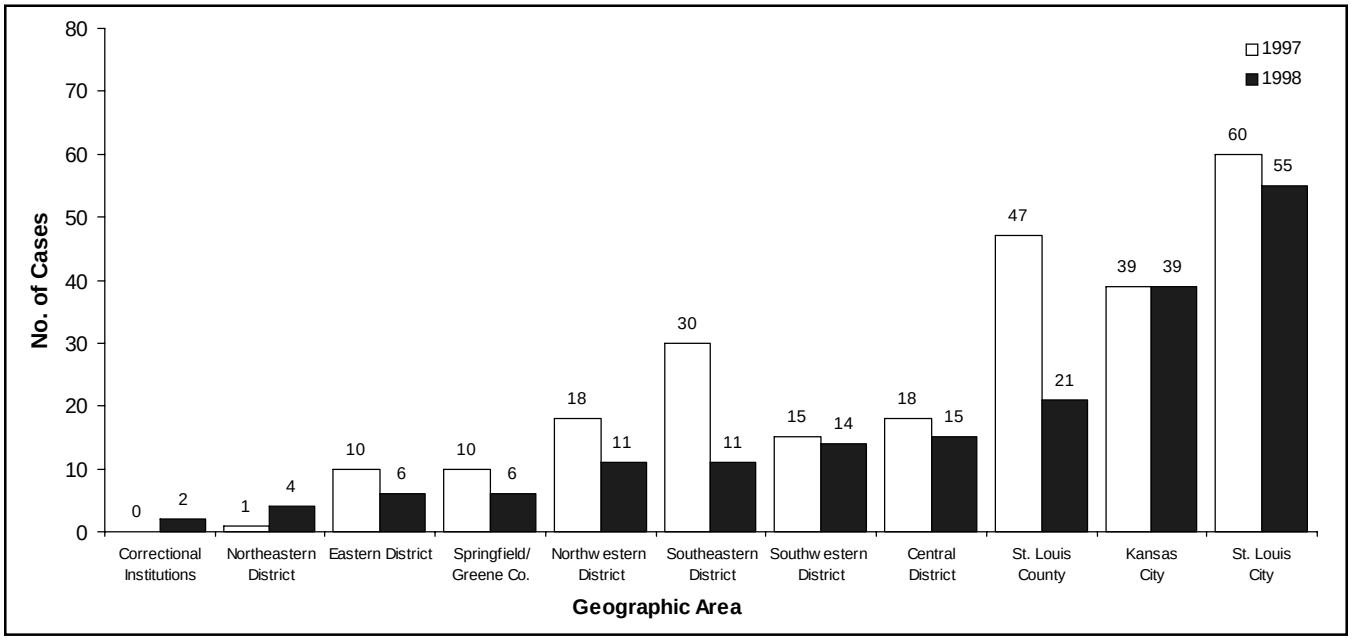

Figure 2. Reported tuberculosis cases by geographic area, Missouri, 1997 and 1998.

District decreased from ten to six cases (-40%). The Northeastern District increased from one case to four cases (300%). An increase from no cases to two cases was observed in the state and federal correctional institutions. See Figure 2.

Reported cases of tuberculosis among males continued to outnumber those in females. In 1998, 123 (67.0%) of the cases were male and 61 (33.0%) were female. In 1997, 152 (61.3%) of the cases were male and 96 (38.0%) were female.

In 1998, individuals with active tuberculosis disease ranged in age from 1 to 99. Decreases in reported cases were observed in all but the 0–4 age group. As in prior years, the largest number of cases occurred in persons age 65 and older. See Figure 3.

Tuberculosis case rates vary significantly among racial and ethnic groups. From 1997 to 1998, case rates per 100,000 population decreased among whites (from 2.6 to 1.9); blacks (from 16.8 to 12.8); Hispanics (from 23.1 to 20.2); and Asians (from 50.7 to 34.0). While these decreases are welcome, the case rate among blacks, Hispanics, and Asians is still noticeably high. See Figure 4.

The largest proportion of active disease cases, 147 cases (80%), were pulmonary compared to 37 cases (20%) which were extrapulmonary. Of the 37 extrapulmonary cases, 11 were dual disease sites. The sites of extrapulmonary disease were lymphatic (14), pleural (10), bone (4), miliary (3), genitourinary (2), peritoneal (2) and other (1). See Figure 5 on page 8.

In 1998, drug susceptibility studies were performed on 131 (71%) of the 184 tuberculosis cases reported. Two (1%) of these 184 cases were found to have multiple-drug resistant organisms. In addition, the isoniazid resistance rate remained high at 5.4 percent. When the isoniazid rate exceeds four percent, initial use of four tuberculosis drugs is recommended for all active disease patients and suspects.

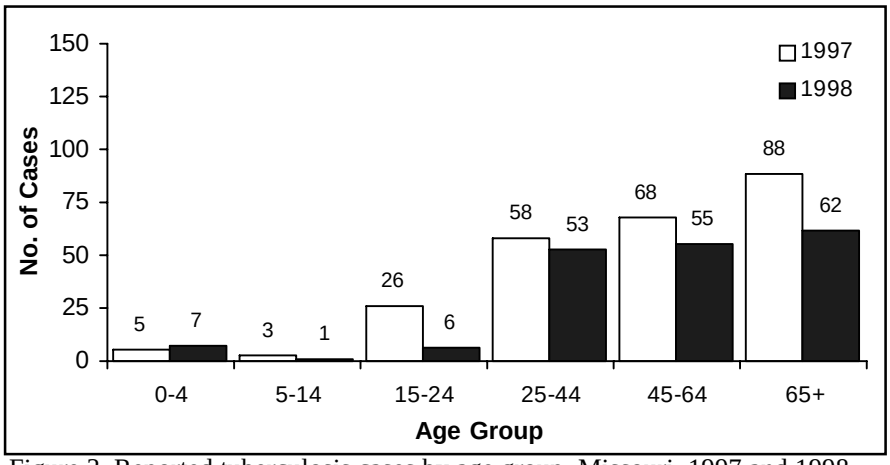

Figure 3. Reported tuberculosis cases by age group, Missouri, 1997 and 1998.

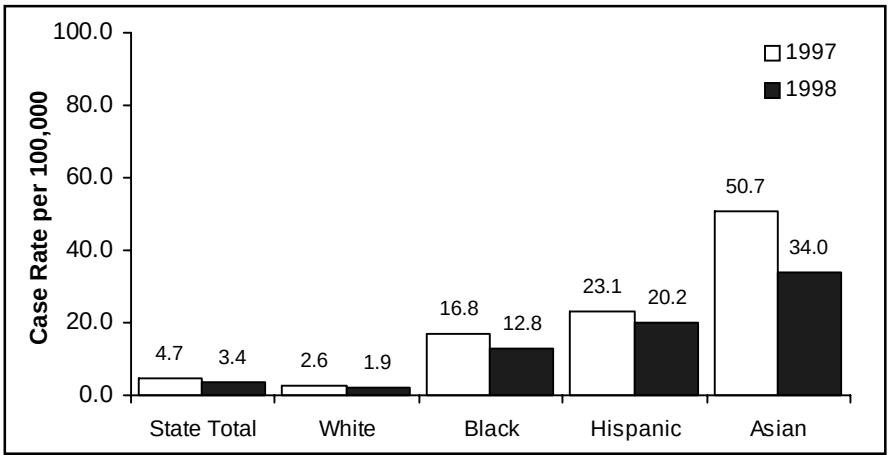

Figure 4. Tuberculosis case rates per 100,000 population by race/ethnicity, Missouri, 1997 and 1998.

A comparison of the tuberculosis case register and the HIV/AIDS case register is done on a quarterly basis to find cases with both conditions. This matching process was done manually from lists of reported cases. As of March 1999, this manual process has been replaced by a computerized data matching system. The computerized matching process is being done quarterly. For the period of January through December 1998, there were a total of eight tuberculosis/AIDS cases. Of the eight cases of tuberculosis/AIDS, four were reported from St. Louis City, three from St. Louis County and one from Kansas City. Six of the eight cases were between the ages of 20 and 39 and two were between 40 and 45. Seven of the eight cases were male and one was female.

In 1998, two active tuberculosis disease cases were reported in the state correctional system as compared to no cases in 1997 and one case in 1996. During 1998, a total of 46,833 inmates were skin tested. Of those, 600 (1.3%) were identified as new positives and 4,531 (9.7%) had a history of previously positive skin tests. During 1998, a total of 390 inmates completed treatment for tuberculosis infection and 178 were released while still receiving tuberculosis infection medication. In 1998, a total of 8,427 state correctional system employees were tested. Of those tested, 81 (1.0%) were identified as new positives and 795 (9.4%) had a history of previously positive skin tests.

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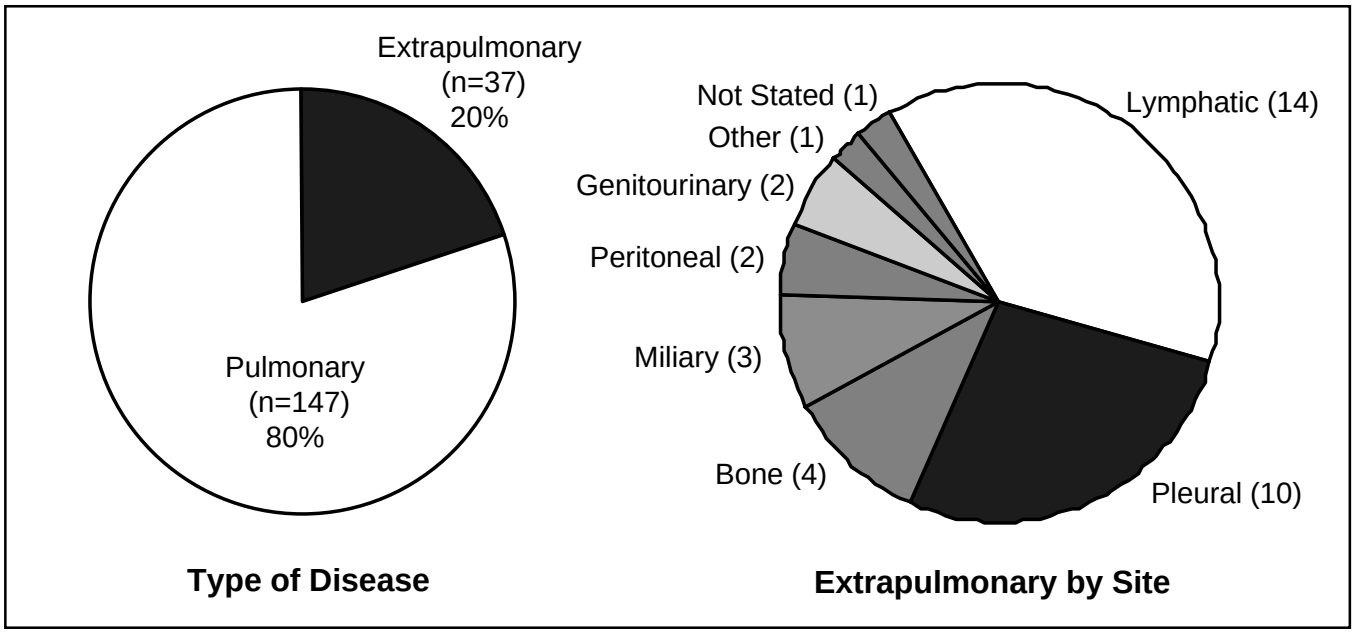

Figure 5. Reported tuberculosis cases by type of disease and site, Missouri, 1998.

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The number of tuberculosis cases reported in nursing homes is of concern to the Section of Vaccine-Preventable and Tuberculosis Disease Elimination. These facilities accounted for 11 (6.0%) of the reported cases in 1998. The section continues to address this issue by working closely with nursing home associations, residential care associations and the Division of Aging to provide facilities with the recommendations for tuberculin skin testing and follow-up of residents and employees.

The number of tuberculosis cases occurring among foreign-born persons decreased from 52 (21%) of reported cases in 1997 to 38 (21%) of reported cases in 1998. Case rates among Asians, who are mostly foreign-born, are disproportionately higher than for other racial and ethnic groups.

The initial use of four tuberculosis medications is another priority for the section in order to lower the drug resistance rate. All active disease patients, and all suspects, should be started on four medications from the beginning of treatment until drug susceptibility is determined. Those medications include isoniazid, rifampin, pyrazinamide and ethambutol or streptomycin. In 1996, only 67.9 percent of active disease patients were placed on the four-drug regimen. This improved to 75.0 percent in 1997 and to 79.0 percent in 1998. However, much work remains in order to reach 100 percent compliance.

Directly observed therapy (DOT) has been adopted as the standard of care in Missouri. Our emphasis is on placing all active disease patients on DOT to ensure that treatment is completed. In areas where there are few active disease cases, steps should be taken to put patients with tuberculosis infection on directly observed preventive therapy (DOPT). These strategies include watching people swallow their pills. Our first priority is to motivate people to come to the local health department for DOT/DOPT. However, if this is not possible, we must go to the patient. Community volunteers can be recruited to assist the local health department in conducting DOPT. Volunteers may include family, friends, neighbors, local ministers, retired persons, pharmacists, school nurses, staff in physician offices and other individuals. In 1996, 74.1 percent of active disease patients were placed on DOT. This improved to 75.0 percent in 1997 and to 84.0 percent in 1998. However, additional efforts must be undertaken in order to reach our goal of 100 percent. This will require the commitment and creativity of all those involved.

Missouri's goal is to have no more than 175 new tuberculosis cases annually by the year 2000, and to then eliminate tuberculosis in the state by the year 2010.

Tuberculosis infection means that the person has bacteria that cause tuberculosis in their body. They are not sick because the bacteria are inactive. They cannot spread the bacteria to others. A person with tuberculosis infection usually has a positive skin test, a normal chest x-ray and does not feel sick.

Tuberculosis disease means that the person is sick from bacteria that are actively reproducing in their body. Persons with pulmonary tuberculosis usually have a positive skin test, an abnormal chest x-ray and one or more of the symptoms of tuberculosis such as persistent cough, chest pain, feeling weak, weight loss, fever and/or night sweats. These people are often capable of giving the infection to others.

Occupational Fatality Surveillance Systems and Field Investigations

Thomas Ray
MO FACE Program

Lives cut short by workplace accidents are not uncommon in Missouri. For years the Department of Health has maintained statistics on these types of deaths. These statistics came from death certificates where the "injury at work" category was marked "Yes." In Missouri, a certified physician, coroner or medical examiner must complete the death certificate. Many times the information to establish work-relatedness of the death was vague or not available. So, generally, work-related deaths were under-reported.

In 1991, two programs were initiated to identify work-related fatalities in Missouri. These are the Missouri Occupational Fatality Assessment and Control Evaluation (MO FACE) program and the Census of Fatal Occupational Injuries (CFOI) program. These programs, sponsored by the National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor, Bureau of Labor Statistics, respectively, identify more than 140 worker fatalities each year in Missouri. As compared to occupational fatality data generated before these programs were in effect, this surveillance system increased occupational fatality reporting by 25 percent. This increase in the number of worker deaths is not due entirely to an increase in the worker fatality rate, but rather to a more effective occupational fatality surveillance system created by these programs.

Until July 1998, these programs were conducted under different divisions within the department. Though they worked together, duplication of efforts was common in the documentation of worker fatalities. Now these two programs have been combined in the Division of Environmental Health and Communicable Disease Prevention's Office of Surveillance, where the documentation process has been streamlined into a seamless occupational fatality surveillance system.

The MO FACE surveillance system is designed to monitor, track and investigate all work-related fatalities in Missouri. With this system, coroners, medical examiners and emergency responders are being made more aware of what constitutes a worker fatality. The program provides an outlet to report a workplace fatality, as well as feedback on how and where this information is used.

MO FACE also conducts in-depth epidemiological investigations of work-related fatalities and works closely with employers involved in workplace fatalities to help them institute procedures to prevent similar incidents from occurring. The program also develops intervention initiatives, such as workshops and seminars, to help employers recognize workplace hazards and prevent fatalities before they occur.

The CFOI program is somewhat different. This program relies on notification from death certificates and worker compensation claims as well as information from the MO FACE program. The CFOI program collects more in-depth information about each fatality and provides statistical information not available through the MO FACE program. In contrast to the MO FACE program, which is conducted in only 21 states, the CFOI program is conducted in all 50 states, Washington DC and Puerto Rico. This makes possible comparison of fatality data from state to state.

Both surveillance programs use principles of epidemiology to monitor, track and investigate all occupational fatalities. "Epi-data" is collected on all work-related fatalities, which can include information about the fatalities of farmers, over-the-road truck drivers, skilled and unskilled laborers, construction workers and carpenters, and those who are self-employed. As with all epidemiological studies, prevention of the undesired event or disease is the ultimate outcome. With these programs, the prevention of traumatic work-related injuries and fatalities is achieved. Safety workshops and intervention seminars are conducted to train employers and employees on proper hazard recognition and avoidance.

Timely notification of work-related fatalities allows for more accurate data collection. Fatality reports from coroners and medical examiners, emergency responders, and the Occupational Safety and Health Administration (OSHA) are the backbone of the MO FACE active surveillance system. Though all fatalities are investigated, MO FACE has detailed investigation protocols for *Falls from Height* and *Machinery-Related* incidents. Occupational deaths are investigated, not to determine fault or legal liability, but to determine whether and how the fatality could have been prevented. Key points of any investigation include employer experience, worker experience and safety training. Another key component of interest is employee training and an employer-facilitated comprehensive safety program. Insight gained from past MO FACE investigations allows us to provide more effective prevention information to employers and their workers.

Nationally, the average rate of occupational deaths for 1992–1996 was 5.0 deaths per 100,000 workers. Missouri's average occupational death rate for the

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Staphylococcus aureus With Resistance to Glycopeptides, Including Vancomycin

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Section of Communicable Disease Control and Veterinary Public Health

Since the emergence of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin has been the first-line and only uniformly effective antimicrobial agent for the treatment of serious infections with MRSA. Of great concern was whether or not *Staphylococcus aureus (S. aureus)* could acquire glycopeptide resistance and become nonresponsive to vancomycin, resulting in staphylococcal infections with similar morbidity and mortality to that which characterized these types of infection in the pre-antibiotic era.

Three patients infected with *S. aureus* with intermediate resistance to the glycopeptide vancomycin (GISA/VISA; minimum inhibitory concentration [MIC] ≥8 µg/mL) have been reported in the United States. The Centers for Disease Control and Prevention (CDC) and other national experts fear that the frequency of vancomycin-resistant/intermediate *S. aureus* will increase rapidly over the next several years and become a major public health problem. Some reports to CDC suggest these pathogens may already be causing therapeutic difficulties, but are not being detected with current laboratory methods.

The most accurate form of antimicrobial susceptibility testing for staphylococci is a minimal inhibitory concentration method (broth dilution, agar dilution or agar-gradient diffusion) using a full 24-hour incubation. The laboratory should ensure the strain is in pure culture and reconfirm the genus and species of the organism: then repeat the susceptibility test for vancomycin using a minimal inhibitory concentration method.

Laboratory evidence suggests that the same mechanism of resistance which caused these strains of *S. aureus* to develop vancomycin MIC ≥8 µg/mL is present in methicillin- or oxicillin-resistant isolates with vancomycin MIC ≥4µg/mL. Therefore, these *S. aureus* strains with reduced susceptibility to vancomycin (MIC ≥4 µg/mL) should be considered a potential public health problem. Through information provided to CDC in collaboration with a proprietary surveillance system of 150 U.S. hospitals, CDC estimates that 0.6 percent of MRSA isolates exhibit reduced susceptibility to vancomycin (MIC ≥4 µg/mL), and each hospital reports approximately 200–700 MRSA isolates per year. Therefore, each hospital has on average one to three MRSA isolates with a vancomycin MIC ≥4 µg/mL.

In order to learn about the epidemiology of these *S. aureus* strains with reduced susceptibility to vancomycin, the Hospital Infections Program, CDC, has developed a nationwide case-control study that has recently received Institutional Review Board approval**.** The study will attempt to define risk factors for acquisition of these organisms, determine the risk of transmission, and assess the adequacy of the CDC recommendations in preventing transmission of these organisms.

CDC is requesting the cooperation of the Missouri Department of Health, local public health agencies, and hospital infection control staff with the following:

(a) Report *Staphylococcus aureus* with reduced susceptibility to vancomycin (**MIC ≥4 µg/mL**), and

(b) Assist with collection of additional medical information on infected patients with **confirmed** MIC ≥4 µg/mL who have been included in CDC's case-control study to define risk factors.

The Missouri Department of Health should be immediately notified of any *Staphylococcus aureus* with resistance as low as MIC ≥4 µg/mL, as well as those with intermediate (MIC ≥8 µg/mL) or greater resistance (MIC ≥32 µg/mL) to vancomycin. The isolate should be sent to the Missouri State Public Health Laboratory for confirmation. If confirmed by the state lab, the isolate(s) will be forwarded to CDC.

Infection control precautions, given on pages 11–12 of this issue, should be initiated promptly without waiting for confirmation.

Thus far, isolates brought to the department's attention as having intermediate or greater resistance to vancomycin, have, fortunately, all been confirmed as sensitive to vancomycin.

Please send all isolates of *Staphylococcus aureus* with reduced susceptibility to glycopeptides/vancomycin to:

State Public Health Laboratory
Attention: Sandy Hanauer
307 West McCarty Street
Jefferson City, Missouri, 65101

If you need assistance with how or when to send specimens, call Sandy Hanauer at (573) 751-0633.

For other questions, please call Marge Borst, RN, BS, CIC, Nurse Epidemiologist at (573) 751-6495 or (800) 392-0272.

Staphylococcus aureus With Reduced Susceptibility to Vancomycin (VISA)

Staphylococcus aureus is one of the most common causes of both hospital- and community-acquired infections worldwide. Since the emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) in the 1980s in the United States, vancomycin has been the antimicrobial agent of choice for serious MRSA infections. In May 1996, *S. aureus* with reduced susceptibility to vancomycin (VISA; minimum inhibitory concentration [MIC] ≥8 µg/mL)) was first reported to have caused infection in a patient in Japan.[1]

By August of 1997, VISA-associated infection had been identified in the United States.[1]

The emergence of VISA in the United States may signal the eventual emergence of strains with full resistance to vancomycin and serious public health consequences. The Centers for Disease Control and Prevention (CDC) and the Hospital Infection Control Practices Advisory Committee have developed interim guidelines when isolates of VISA are identified.[2] Using these guidelines, each health care facility should develop a plan in which responsibilities for critical departments and personnel are clearly delineated.

TEAR OUT FOR FUTURE REFERENCE

Summary of Interim Guidelines for Prevention and Control of Staphylococcal Infection Associated With Reduced Susceptibility to Vancomycin

Preventing the Emergence of Vancomycin Resistance

Antimicrobial use is a major risk factor for the emergence of antimicrobial-resistant pathogens. Reduction of overuse and misuse of antimicrobials will decrease the risk for emergence of staphylococci with reduced susceptibility to vancomycin. Medical and ancillary staff members who are responsible for pharmacy formulary decisions should review and restrict use of vancomycin and ensure appropriate use of all antimicrobials.

Detection of Staphylococci with Reduced Vancomycin Susceptibility

Use of recommended laboratory methods (including media and incubation methods, antimicrobial susceptibility testing methods, and susceptibility breakpoints) for identifying VISA is essential.

When antimicrobial susceptibility testing indicates reduced vancomycin susceptibility or resistance, the specimen should be retested. After repeat testing, if species identification and vancomycin test results are consistent, send isolate(s) to the Missouri Department of Health State Public Health Laboratory (SPHL), Attention: Sandy Hanauer, 307 West McCarty Street, Jefferson City, Missouri, 65101, Ph: (573) 751-0633, and immediately report findings to the Missouri Department of Health, Section of Communicable Disease Control and Veterinary Public Health at (573) 751-6115 or (800) 392-0272.

It is recommended that staphylococci isolated from patients who fail to respond to vancomycin therapy be retested because resistance may have emerged during therapy.

Obtaining Investigational Antimicrobials

The susceptibility pattern of a particular staphylococcus strain, the site of infection, and the response to conventional therapy is important in determining the need for investigational antimicrobials to treat infections caused by staphylococci with reduced vancomycin susceptibility. Several antimicrobial agents in clinical development may be useful in treating vancomycin-resistant enterococci and methicillin-

resistant *S. aureus*. Some of these agents may also be useful in treating infections with reduced susceptibility to vancomycin. Physicians treating infections caused by staphylococci with reduced vancomycin susceptibility can obtain information about investigational drug therapies from the U.S. Food and Drug Administration's Division of Anti-Infective Drug Products at (301) 827-2120. The physician will be requested to send the isolate to CDC for microbiologic and epidemiologic evaluation.

Preventing the Spread of Staphylococci with Reduced Vancomycin Susceptibility

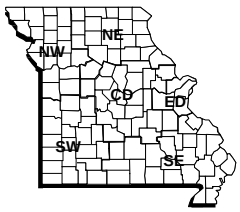
To prevent the spread of staphylococci with reduced susceptibility to vancomycin within and between facilities and to minimize the potential for the organism to become endemic, the following steps should be taken whenever VISA is isolated.

1. The laboratory should immediately notify infection control personnel, the clinical unit, and the attending physician. Isolate should then be retested and sent to SPHL for confirmation.
2. Infection control personnel, in collaboration with appropriate authorities (including the Missouri Department of Health and CDC), should initiate an epidemiologic and laboratory investigation.
3. Medical and nursing staff should:
   a. Isolate the patient in a private room and use contact precautions (gown, mask, glove, and antibacterial soap for handwashing);
   b. Minimize the number of persons with access to colonized/infected patients; and
   c. Dedicate specific health care workers to provide one-on-one care for the colonized/infected patient or the cohort of colonized/infected patients.
4. Infection control personnel/designees should:
   a. Inform all personnel providing direct patient care of the epidemiologic implications of such resistant strains and of the infection control precautions necessary for their containment;
   b. Monitor and strictly enforce compliance with contact precautions and other recommended infection control practices;
   c. Determine whether transmission has already occurred by obtaining baseline cultures (before initiation of precautions) for staphylococci with reduced susceptibility to vancomycin from the anterior nares and hands of all health care workers, roommates, and others with direct patient contact;
   d. Assess efficacy of precautions by monitoring health care personnel for acquisition of staphylococci with reduced susceptibility to vancomycin as recommended by consultants from the Missouri Department of Health or CDC;
   e. Avoid transferring infected patients within or between facilities, and if transfer is necessary, fully inform the receiving institution or unit of the patient's colonization/infection status and appropriate precautions; and
   f. Consult with the Missouri Department of Health and CDC before discharge of the colonized/infected patient.

REFERENCES:

1. CDC. Update: *Staphylococcus aureus* with reduced susceptibility to vancomycin—United States, 1997. MMWR 1997;46(35).
2. CDC. Interim guidelines for prevention and control of staphylococcal infection associated with reduced susceptibility to vancomycin. MMWR 1997;46(27).

If you have questions, please contact the Missouri Department of Health, Section of Communicable Disease Control and Veterinary Public Health at (573) 751-6115 or (800) 392-0272.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

QUARTERLY DISEASE REPORT

Reporting Period*
October - December, 1998

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	1998	1997	For 1998	For 1997	5 YR MEDIAN
Vaccine Preventable																
Influenza	1	0	2	4	4	1		1	0	2	0	15	43	1089	270	272
Mumps	0	0	0	1	0	0		0	0	0	0	1	0	4	0	25
Pertussis	2	4	0	2	4	0		5	11	1	2	31	21	59	80	74
Measles	0	0	0	1	0	0		0	0	0	0	1	0	1	1	2
Viral Hepatitis																
A	2	1	2	13	3	17		8	1	2	50	99	288	637	1151	1338
B	2	4	2	6	3	11		9	18	2	9	66	101	252	360	437
C	0	0	0	0	0	2		0	0	0	2	4	0	14	6	N/A
Non-A Non-B	0	0	0	0	0	0		0	0	0	0	0	1	1	4	23
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	2	1	1
Meningitis																
Aseptic Meningitis	0	7	7	10	4	0		17	0	21	0	66	24	317	99	175
Meningococcal Disease	0	0	0	0	0	1		1	3	2	0	7	7	25	43	43
Meningococcal Other	0	0	0	0	2	0		1	2	2	0	7	20	55	63	N/A
Enteric Infections																
E. Coli O157:H7	0	1	0	1	4	5		1	0	6	0	18	13	55	58	48
Campylobacter	26	9	3	16	16	16		8	2	24	16	136	126	535	574	601
Salmonella	22	9	2	28	17	15		7	8	26	6	140	127	632	568	568
Shigella	7	6	0	14	2	21		6	11	54	2	123	38	221	222	654
Parasitic Infections																
Cryptosporidiosis	1	0	0	0	0	2		0	0	3	3	9	10	29	38	N/A
Giardiasis	32	24	3	18	6	32		15	19	63	16	228	255	790	800	774
Respiratory Diseases																
Legionellosis	0	1	0	2	0	0		0	0	1	0	4	19	18	26	26
Sexually Transmitted																
AIDS	16	7	4	1	5	8	12	28	37	18	8	152	144	501	489	178
HIV Infection	17	6	1	6	12	9	1	21	14	12	8	129	107	438	489	N/A
Chlamydia	283	72	76	309	190	248		698	776	597	****	3213	N/A	12466	N/A	N/A
Gonorrhea	126	32	19	102	82	48		801	1045	518	****	2753	2116	9385	7658	N/A
P & S syphilis	0	0	0	1	3	0		1	17	6	****	28	27	109	118	N/A
Tuberculosis																
TB Disease	1	3	1	5	1	3	1	7	10	6	0	38	49	184	248	N/A
TB Infection	137	58	46	61	55	38	122	179	304	151	60	1211	1000	5694	6205	N/A
Zoonotic																
Ehrlichiosis	0	0	0	0	1	0		0	0	1	0	2	5	12	20	N/A
Lyme-like Disease	0	0	0	0	1	0		0	0	0	0	1	13	12	28	53
Rabies (Animal)	1	1	0	1	6	1		0	0	0	1	11	9	42	31	30
Rocky Mountain Spotted Fever	0	0	0	0	0	0		0	0	0	1	1	2	5	24	22
Tularemia	0	0	0	0	0	0		0	0	0	1	1	7	12	18	18

Outbreaks
Foodborne - 2
Waterborne - 1
Nosocomial - 4
Pediculosis - 1
Scabies - 2
Fifth Disease - 1
Leptospirosis - 1
Shigella - 1
AGI - 2
Influenza - 1
Environmental Hazard - 1

Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis
Hib other invasive - 3
Polio
Rubella
Tetanus

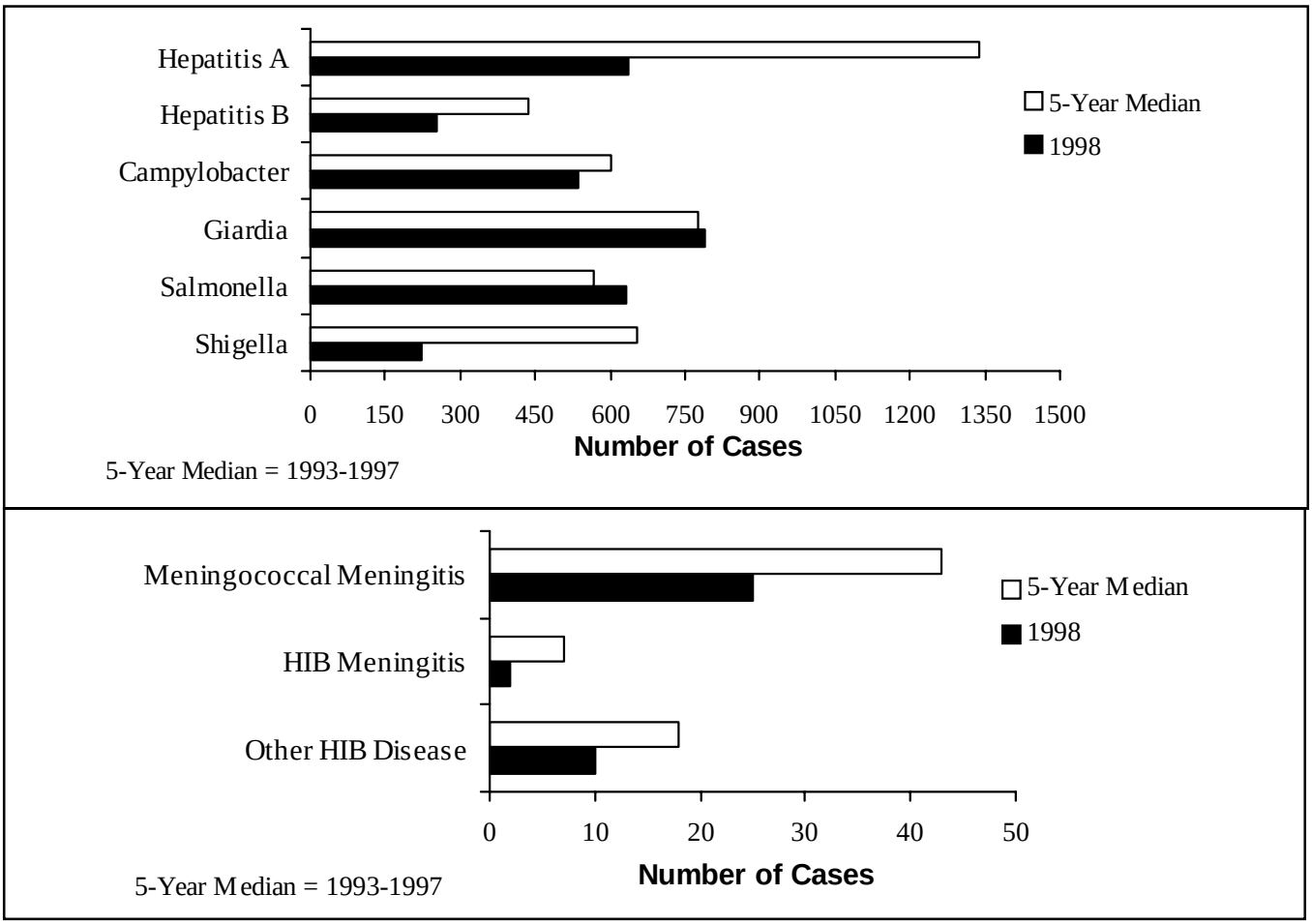
Low Frequency Diseases
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Encephalitis
Granuloma Inguinale
Kawasaki Disease - 2
Leptospirosis - 1
Listeria - 5
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A - 7
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome - 1
Trichinosis
Typhoid Fever - 2

*Reporting Period Beginning October 4, 1998 and Ending January 2, 1999.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions
****Included in SW District
N/A Data unavailable

Due to data editing, totals may change

TEAR OUT FOR FUTURE REFERENCE

Disease Reports, January–December 1998 and 5-Year Median



Viral Hepatitis

During the January–December 1998 time period, hepatitis A cases decreased to 637 cases, which is a 44.7% decline from the 1,151 cases reported in 1997. This is also a 52.4% decline from the five-year median of 1,338. The number of cases decreased in each district from 1997 to 1998.

Hepatitis B decreased 30% from 360 cases in 1997 to 252 cases in 1998. However, the total of 1998 cases was 42.3% lower than the five-year median of 437.

Enterics

Campylobacter decreased slightly by 6.8% during 1998, from 574 cases in 1997 to 535 cases in 1998. The total number of 1998 cases declined 11% from the five-year median of 601 cases. Salmonella increased by 11.3% from 568 cases in 1997 to 632 cases in 1998. Four of the six health districts showed an increase in salmonella cases. Central District increased 53.6% from 69 cases in 1997 to 106 cases in 1998. Eastern District increased 49.3% from 136 cases in 1997 to 203 cases in 1998. Shigellosis cases declined slightly from 222 in 1997 to 221 in 1998. This is a .5% drop. The 221 cases in 1998 represent a 66.2% decline from the five-year median.

Parasites

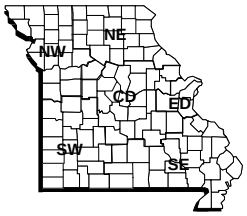
Giardiasis decreased slightly by 1.3% during 1998, from 800 cases in 1997 to 790 cases in 1998. However, this is a slight 2.1% increase above of five-year median of 774 cases.

Meningitis

Meningococcal meningitis decreased 41.9% during 1998, from 43 cases in 1997 to 25 cases in 1998. The five-year median is also 43 cases.

HIB Disease

Following no cases reported in 1996 and one case reported in 1997, two cases of *Haemophilus influenzae* type b (Hib) meningitis were reported in Missouri during 1998. The five-year median is 7 cases. Other invasive cases (non-meningitis) of *Haemophilus influenzae* that may not be affected by the vaccine increased 42.9% during 1998 from 7 cases in 1997 to 10 cases in 1998. However, the 10 cases of other invasive Hib disease reflected a decline of 44.4% from the five-year median of 18 cases.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

QUARTERLY DISEASE REPORT

Reporting Period*
January - March, 1999

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	1999	1998	For 1999	For 1998	5 YR MEDIAN
Vaccine Preventable																
Influenza	88	30	43	21	23	37		23	57	231	66	619	1061	619	1061	204
Measles	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Mumps	0	0	1	0	0	0		0	0	0	0	1	2	1	2	2
Pertussis	1	1	1	2	2	0		3	0	0	0	10	9	10	9	7
Viral Hepatitis																
A	6	4	1	5	22	15		11	2	1	44	111	178	111	178	196
B	2	2	2	3	4	9		13	0	2	9	46	63	46	63	114
C	0	0	0	1	0	2		26	0	1	0	30	3	30	3	N/A
Non-A Non-B	0	0	0	0	0	0		0	0	0	0	0	1	0	1	2
Unspecified	0	0	0	0	0	0		0	0	0	0	0	2	0	2	0
Meningitis																
Meningococcal Disease	1	2	0	3	1	1		4	0	9	0	21	8	21	8	21
Meningococcal Other	0	2	0	1	0	1		2	2	0	0	8	23	8	23	13
Enteric Infections																
Campylobacter	22	4	0	2	13	10		7	1	20	3	82	69	82	69	86
E. Coli O157:H7	1	1	1	1	1	1		0	0	0	0	6	3	6	3	2
Salmonella	9	6	3	6	3	13		9	4	17	5	75	69	75	69	81
Shigella	3	3	0	38	1	20		4	7	13	5	94	20	94	20	71
Parasitic Infections																
Cryptosporidiosis	1	0	0	0	0	0		1	1	1	1	5	1	5	1	N/A
Giardiasis	16	6	5	10	7	6		7	7	22	4	90	133	90	133	133
Respiratory Diseases																
Legionellosis	0	0	0	0	0	0		0	1	0	0	1	6	1	6	4
Sexually Transmitted																
AIDS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HIV Infection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlamydia	294	108	81	204	254	261		809	881	609	****	3501	2845	3501	2845	N/A
Gonorrhea	132	23	20	26	97	55		443	630	416	****	1842	1638	1842	1638	N/A
P & S syphilis	4	0	0	0	0	0		1	20	6	****	31	34	31	34	N/A
Tuberculosis																
TB Disease	2	1	1	2	4	4	0	4	10	7	2	37	38	37	38	N/A
TB Infection	75	32	55	41	43	37	103	202	326	216	40	1170	1300	1170	1300	N/A
Zoonotic																
Ehrlichiosis	0	0	0	0	0	0		0	0	0	0	0	0	0	0	N/A
Lyme-like Disease	0	0	0	0	0	0		0	0	0	0	0	0	0	0	6
Rabies (Animal)	0	0	0	0	4	0		0	0	0	1	5	8	5	8	8
Rocky Mountain Spotted Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Tularemia	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0

Outbreaks
Acute Respiratory Illness - 2
Clostridium difficile - 1
Influenza - 6
Influenza-like - 16
Norwalk-like - 2
Scabies - 1
Shigella - 2
Strep - 1

Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis
Hib other invasive - 10
Polio
Rubella
Tetanus

Low Frequency Diseases
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Encephalitis
Granuloma Inguinale
Kawasaki Disease - 3
Leptospirosis
Listeria - 4
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A - 27
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome - 6
Trichinosis
Typhoid Fever

*Reporting Period Beginning January 3 and Ending April 3, 1999.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions
****Included in SW District
N/A Data unavailable

Due to data editing, totals may change

TEAR OUT FOR FUTURE REFERENCE

Missouri Morbidity and Mortality Reports of Selected Communicable Diseases - 15 Year Report

	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984
AIDS	466	501	845	769	727	1644	657	651	596	478	401	240	91	52	28
Brucellosis	3	2	2	0	0	0	0	3	1	2	4	14	4	12	7
Campylobacter	535	574	554	601	631	616	614	602	547	473	441	260	281	304	260
Chickenpox	6362	6319	5830	8840	10147	9609	10009	7678	10591	9086	11350	8595	5093	2474	2565
Chlamydia	12655	12257	11952	12084	12244	11625	11907	10643	11151	8151	6239	2944	1532	412	9
Encephalitis, Inf.	0	9	5	11	14	26	16	22	12	6	8	11	13	12	11
Giardiasis	790	800	777	761	774	770	739	790	878	859	654	690	516	458	462
Gonorrhea	9463	7658	8415	11302	12555	13147	14887	17450	20012	21053	17241	16491	19029	20023	20042
Haemophilus influenzae type B															
Meningitis	2	1	0	10	7	12	22	42	88	106	138	131	172	108	104
Other Invasive	10	7	8	18	44	123	59	39	57	-	-	-	-	-	-
Hepatitis A	637	1151	1414	1338	619	1443	1500	653	619	810	897	560	126	98	138
Hepatitis B	252	360	326	437	538	585	535	549	633	704	639	460	420	359	297
Hepatitis C	14	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Non A, Non B	1	4	23	23	32	25	27	31	42	53	50	46	39	42	18
Unspecified	2	1	0	1	1	19	9	15	19	13	21	21	15	24	46
Influenza (confirmed)	1089	270	283	491	163	272	111	462	220	293	148	69	78	61	39
Lyme Disease	12	28	52	53	102	108	150	207	205	108	-	-	-	-	-
Malaria	15	16	11	9	14	9	12	9	13	13	6	8	12	5	8
Meningitis, Mening.	25	43	57	54	43	34	32	37	31	21	33	35	40	46	53
Meningitis, Other	55	63	41	22	35	-	-	-	-	-	-	-	-	-	-
Mumps	4	0	10	25	44	46	39	40	62	87	68	38	23	18	11
Pertussis	59	80	74	63	45	144	120	83	116	141	25	46	32	35	23
Polio, all forms	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Rabies, Animal	42	31	26	30	27	35	37	28	30	62	36	59	75	59	70
RMSF	5	24	19	30	22	20	24	25	36	48	54	26	25	10	14
Rubella	2	2	0	0	2	1	1	5	3	4	0	0	1	7	0
Rubeola	1	1	3	2	161	1	0	1	103	671	65	190	32	5	6
Salmonellosis	632	568	565	577	642	529	426	616	723	676	772	660	728	690	617
Shigellosis	221	222	387	1138	654	674	742	259	284	411	607	471	89	143	244
Syphilis, Total	384	505	603	1271	1985	2499	1940	926	598	388	473	328	494	578	712
Primary & Secondary	109	118	221	584	987	1354	1167	572	272	162	154	90	110	133	186
Tetanus	0	0	1	3	1	1	1	1	0	4	1	1	2	3	6
Tuberculosis	184	248	224	244	260	256	245	254	312	278	275	339	338	311	354
Tularemia	12	18	9	25	24	17	34	44	33	39	45	58	32	35	40
Typhoid Fever	4	1	2	3	1	2	3	2	4	2	3	7	6	6	6
Yersinia enterocolitica	16	30	16	21	40	26	37	48	32	36	30	10	6	2	3

State Public Health Laboratory - 1998 Annual Report

Metabolic Disease Screening

Infants screened 77,987
Presumptive positives:
- PKU 10
- Hypothyroidism 185
- Galactosemia 27
- Sickle Cell 58
- Other hemoglobinopathies 1,383

Serology/Virology

HIV Serology 75,759
- HIV antibody positive 610

Syphilis Serology 33,152
Sero-confirmed reactive 1,103

Hepatitis A Serology 554
- Positive 112

Hepatitis B Serology 8,138
- Positive 95

Measles, Mumps and Rubella (Diagnostic Serologies) 9,214
- Measles (IgM positive) 1
- Mumps (significant rise in titer) 1
- Rubella (IgM positive) 11
- Prenatal rubella screens 9,135
  - Nonreactive patients 1,050

Viral Isolation 2,160
- Influenza isolates 109
- Enterovirus isolates 58
- Herpes isolates 437

Rabies 2,886
- Positive specimens 42

Microbiology

Enterics 1,673
- *Salmonella* 880
- *Shigella* 136
- *Campylobacter jejuni* 26
- *E. coli* O157:H7 65

Parasitology 3,547
- Ova/parasites found 828

Reference Bacteriology 1,480
- *Francisella tularensis* 5
- *Haemophilus influenzae* 34
- *Neisseria meningitidis* 82
- *Bordetella pertussis* 72

DNA Probe for Chlamydia/Gonorrhea 73,502
- *N. gonorrhoeae* 1,396
- *Chlamydia trachomatis* 3,861

Tuberculosis 9,268
- Positive Cultures 561

Environmental Testing

Chemistry 15,679
- Blood lead samples 14,111
- Total analyses 25,050
- Blood lead ≥20µg/dL 236
- Environmental lead samples 480

Bacteriology—Water
- **Private Samples 10,936**
  - Coliform positive 2,704
- **Public Supplies 61,363**
  - Coliform positive 2,031
  - *E. coli*/fecal coliform positive 200
- **Swimming Pools 1,624**

Food/Dairy/Beverage 3,433
- Excessive bacteria, coliform, yeast and mold 107

Tick-Borne Disease Summary – 1998

F. T. Satalowich, D.V.M., M.S.P.H.
Section of Environmental Health and Communicable Disease Prevention

The tick can be defined as an eight-legged, blood-sucking arachnid parasite of the superfamily Ixodoidea. There are four developmental stages: egg, larva, nymph and adult. Seed ticks are the larva stage of all ticks. The larvae of all ticks are six-legged, which after moulting emerge as eight-legged nymphs.

The foreleg tarsi of all ticks have a unique sensory apparatus, called the Haller's organ, utilized for sensing chemical stimuli, odor, temperature, humidity and other life stimuli. The action of this organ allows the tick to select the animal on which to feed. Pheromones stimulate group assembly, species recognition, mating and host selection in ticks. All ticks are divided into two subfamilies:

- **Argasidae or Soft Ticks**—Include the genera *Argas*, *Otobius*, *Antricola* and *Ornithodoros*. There are over 155 species. Argasidae are highly specialized for sheltering, parasitizing and feeding on only a single kind of vertebrate that enters their microhabitat. After a blood meal, the female deposits a few hundred eggs in several batches.

- **Ixodidae or Hard Ticks**—Include the genera *Boophilus*, *Amblyomma*, *Dermacentor*, *Haemaphysalis*, *Hyalomma*, *Ixodes*, *Rhipicephalus* and *Rhipicentor*. There are over 650 species of Ixodidae. Egg batches are larger, ranging from 1,000 to 4,000, and may be as high as 12,000. Although most species are host specific, there are deviations. The proximity of acceptable hosts, air temperature gradients and atmospheric humidity during resting and questing periods are among the numerous factors that regulate the development of each stage.

Figure 1. Amblyomma americanum

Figure 2. Amblyomma maculatum

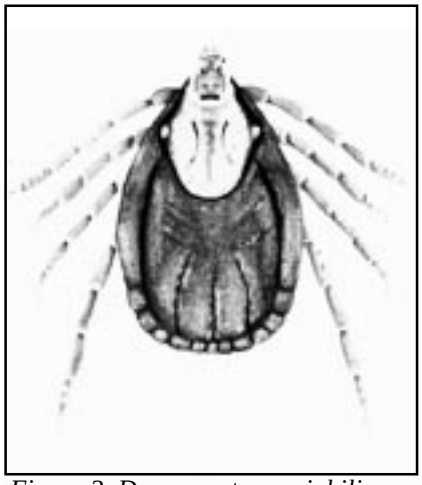


Figure 3. Dermacentor variabilis

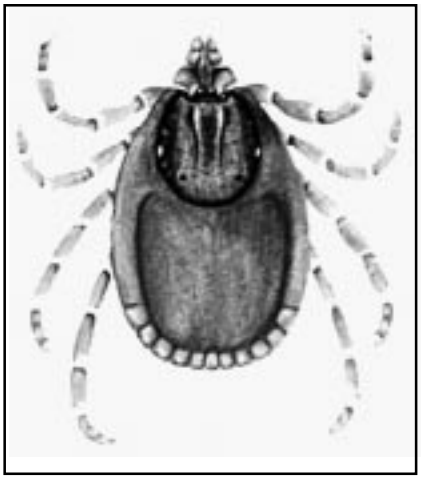


Figure 4. Rhipicephalus sanguineus

Ticks of Missouri

Missouri, with its natural climatic conditions of heat and moisture, is an ideal ecological setting for an abundance of tick species. The ticks usually found in Missouri are:

- *Amblyomma americana* or Lone Star Tick—Considered the primary vector of tularemia in Missouri. See Figure 1.

- *Amblyomma maculatum*—Considered a probable vector of tularemia and possibly Rocky Mountain Spotted Fever (RMSF) in Missouri. See Figure 2.

- *Dermacenter variabilis* or American Dog Tick—Considered the primary vector of RMSF in Missouri. See Figure 3.

- *Rhipicephalus sanguineus* or Brown Dog Tick—Considered the vector of ehrlichiosis in dogs in Missouri. At one time considered a vector of ehrlichiosis in humans, but this theory has not been proven. See Figure 4.

- *Ixodes scapularis* or Deer or Wood Tick—Considered the possible vector of borreliosis in Missouri.

While the above ticks are thought to be the prime vectors of specific diseases, it does not mean that *Amblyomma americana* could not transmit RMSF, ehrlichiosis or a *Borrelia* species. The primary vectors for ehrlichiosis and borreliosis are not known in Missouri. From a purely scientific perspective, if a specific species of tick has the anatomic physiological capability to transmit a disease, it could be assumed that they could be capable of transmitting another disease. Indeed this does sporadically happen. The *Amblyomma americana* has the capability to transmit tularemia and RMSF. It has been successfully infected with *Borrelia burgdorferi* in the laboratory and found to transmit the organism. However, it did not remain infected. What the role of this tick is in the transmission of Borreliosis in nature is not known.

In nature there are many variables that affect a specific organism, the ecology of the specific tick species and the environment that make a specific species a viable vector of a specific disease. Unfortunately, all of these factors are not known nor understood. What is known is that a human is not the natural host for any tick. The above-mentioned ticks may bite humans as a means of last resort or of favorable opportunism. Since humans are not the normal host, the *Amblyomma* and *Dermacentor* species must spend four to six hours acclimating to the human host prior to taking a blood meal and thus transmitting the disease. The *Ixodes* species must acclimate for 12–20 hours to the human host prior to taking a blood meal and thus transmitting disease. The tick may be attached by inserting its mouth parts into the skin, but does not start a blood meal, and thus, cannot regurgitate the organism into the new host.

Of the millions of vector ticks in nature, only a small percent are likely to be infected when a person is bitten. In population studies of ticks, if three to five percent are found to be infected with a disease organism, it is considered high. Thus most ticks are not carriers of disease, and requests to have individual ticks tested for disease organisms are usually not productive or cost effective. Tick feeding activity does produce host reactions caused by the ticks salivary fluids and toxins, and skin wounds which are susceptible to secondary bacterial infections. This local reaction at times can be very severe.

Epidemiology of Tick-Borne Diseases

Historically, each of the tick-borne diseases affects 20–60 individuals per year in Missouri. RMSF accounts for 90 percent of the rickettsial diseases that occur annually in the United States. During the 1980s, approximately 50 deaths per year in the United States were attributed to RMSF. An endemic focus for RMSF exists in Missouri, Arkansas, Oklahoma and Texas. In 1998, five cases of RMSF were reported in Missouri. The highest number of cases in Missouri, 54, was reported in 1988. The ten year average is 25.3 cases per year.

Tularemia is enzoonotic in animals in Missouri. This tick-borne disease in Missouri has declined from an average of 35 cases per year over the past 15 years to a record low of only nine cases reported in 1996. In 1998, 12 cases of tularemia were reported in Missouri. The ten-year average is 25.5 cases per year.

(continued on page 28)

Table 1. Reporting Criteria for Tick-Borne Diseases
(A confirmed case meets both clinical and laboratory criteria.)

	Ehrlichiosis	Tularemia	Rocky Mountain Spotted Fever	Borelliosis*
Clinical	Tick exposure, acute onset, febrile myalgia, headache, rigor, malaise	Several disease forms, ulceroglandular, intestinal, pneumonic	Tick exposure, acute onset, febrile, myalgia, headache, petichial rash	Characteristic erythematous rash >5 cm in diameter **OR** Chronic manifestations
AND				
Laboratory	Four-fold titer rise in IFA for *E. canis* or *E. chaffeensis* **or** PCR **or** *Intracytoplasmic morulae* + IFA >64	Isolate *F. tularensis* **or** four-fold titer rise for *F. tularensis* antigen	Four-fold titer rise in IFA for *Rickettsia rickettsii* **or** PCR **or** isolate	Isolation of *B. burgdorferi* **or** EIA + Blot** **or** IFA + Blot**

* Lab methods are not decisive in Missouri and are not required for confirmation.
** Blot is positive for IgM if 2 of the following bands are present: 24kDa, 39kDa, and 41 kDa, and positive for IgG if 5 of the following bands are present: 18 kDa, 21 kDa, 28 kDa, 30kDa, 39 kDa, 41 kDa, 45 kDa, 58 kDa, 66 kDa, and 93 kDa.

1998 Mosquito-Borne Disease Surveillance Program

F. T. Satalowich, D.V.M., M.S.P.H.
Division of Environmental Health and Communicable Disease Prevention

The Department of Health conducted surveillance programs for St. Louis (SLE), Western Equine (WEE), California (CE) and LaCrosse (LAC) encephalitis during the 1998 mosquito season. The following active surveillance systems were operational during that period:

- Active Surveillance of Human Cases of Disease
- Active Surveillance for Equine Cases of Disease
- Active Surveillance for Arbovirus Activity in Wild Birds
- Active Surveillance for Arbovirus Activity in Mosquitoes

The Veterinary Medicine Diagnostic Laboratory (VDML) at the University of Missouri–Columbia tested human, horse and avian serology specimens via contract. All sera were tested using an Enzyme Linked Immunosorbent Assay (ELISA) technique designed for detection of IgM antibody specific for the above viruses. Suspect positives were submitted to the Centers for Disease Control and Prevention (CDC) at Fort Collins, Colorado for confirmation.

Active Surveillance for Human Cases of Disease

Human arbovirus surveillance activities consisted of standard reporting by physicians in addition to statewide telephone contact with approximately 88 pre-designated key hospitals on a weekly basis through the sentinel active surveillance system. Eight human sera were tested for SLE, one for Eastern encephalitis, and three for Western encephalitis. All samples tested negative. The active surveillance system for human cases of encephalitis detected no human arboviral cases in Missouri.

Active Surveillance for Equine Cases of Disease

Thirteen veterinarians throughout the state were contacted by telephone on a weekly basis. All reports indicated no arboviral activity in horses in Missouri in 1998. Three equine sera were analyzed by the VMDL. All three were negative for SLE, WEE and Eastern Equine Encephalitis (EEE).

Active Surveillance for Arbovirus Activity in Wild Birds

Trapping of wild birds began on June 17 and concluded on October 14, 1998 via a cost-reimbursement contract with the United States Department of Agriculture–Wildlife Service (USDAWS). Blood specimens from a total of 1,005 wild birds, comprised primarily of House Sparrows (*Passer domesticus)*, were collected. Bird collection sites were chosen from the following 12 counties: Boone, Buchanan, Cape Girardeau, Callaway, Davies, Jackson, Lawrence, Lewis, Marion, New Madrid, St. Charles and St. Louis. Japanese mist nets were deployed at locations in close proximity to livestock and human activity (i.e. horse stables, dairy farms, hog lots and sheep farms). Collections from each geographic area were made at approximately two to three week intervals. Analysis of blood specimens provided no evidence that viral activity was occurring in the sampled bird populations.

Active Surveillance for Arbovirus Activity in Mosquitoes

Mosquito collections were conducted in the eastern Missouri counties of Cape Girardeau and St. Louis and the city of St. Louis. Because these areas were most devastated by the 1993–95 floods, they serve as an excellent representative of the mosquito ecological set. Adult mosquito collections varied by site, but as a whole began on June 1, 1998 and terminated on September 11, 1998. Trapping was accomplished with CO_2 baited CDC and EVS Light Traps, Reiter Gravid Traps, and hand collection at selected resting stations by aspirator.

The Virology Laboratory at Southeast Missouri State University assayed potential vector mosquitoes for SLE, WEE, EEE, and LAC antigens by Antigen Capture ELISA. Pools included approximately 50,325 specimens of *Culex pipiens, Culex restuans, Culex salinarius, Culex tarsalis, Aedes triseriatus,* and *Aedes albopictus. Culex pipiens* complex mosquitoes were assayed for SLE and WEE; *Coquillettidia perturbans* and *Aedes albopictus* were tested for EEE; and *Aedes albopictus* and *Aedes triseriatus* were assayed for LAC antigen. A total of 1,719 pools of mosquitoes were tested. All tests were negative, indicating that arboviral activity was not occurring or could not be detected in mosquitoes in these areas.

On July 30, 1998, the Bureau of Veterinary Public Health was informed by the VMDL, the USDA Virology Laboratory and a poultry producer of possible EEE in a confinement turkey breeding operation in Lawrence County. Approximately 40,000 turkeys located in three different houses had experienced a disease condition resembling EEE. All birds had supposedly spent their entire lives within a ten-mile radius, although they had been at a total of three different sites within that area. The question to be addressed in this situation was whether this confinement flock had served as a natural sentinel flock. Was it possible that the flock had been infected with EEE by mosquitoes in the area, or was it possible that the hatching eggs had been brought in from an area where

EEE was endemic. The EEE virus had never been isolated in Missouri.

Original test sera from the flocks were obtained from the USDA laboratory to be retested at the VMDL utilizing the antigen ELISA capture technique. The poultry producer provided current statistical samples of sera for synchronized testing. Under the Department of Health (DOH) contract with USDAWS, arrangements were made to capture wild birds at the three sites within the area. Under the DOH contract with Southeast Missouri State University's Virology Laboratory, arrangements were made to collect mosquitoes from the three sites within the area. The CDC Entomology Laboratory at Fort Collins, Colorado was alerted and performed confirmatory tests. Analysis of results confirmed that the confinement turkey flocks had been infected with the Highland J virus, not EEE. This is a virus that occurs in turkeys, but does not affect humans.

Satellite Conference on Influenza

September 28, 1999
10:00 a.m. to Noon

GOAL: Enable participants to prepare for the 1999–2000 influenza season with an update on influenza surveillance, laboratory testing and provision of vaccine.

AGENDA:

- Surveillance systems for influenza (active, passive, sentinel)
- Hong Kong investigation potential for pandemic
- Influenza vaccine composition—How is it decided
- Pneumovax
- Laboratory tests and what is needed for each.....and more

TARGET AUDIENCE: Local public health agency staff, infecton control nurses and hospital staff.

For more information, contact your local public health agency or Nancy Bush at the Missouri Department of Health at (573) 751-6058.

Sponsored by the Missouri Department of Health
and the Centers for Disease Control and Prevention.

Occupational Fatality Surveillance Systems

(continued from page 9)
same time period was slightly higher at 5.2 deaths per 100,000 workers. Missouri's 1997 occupational death rate was 4.2, which is lower than the national rate of 4.7.* Currently, the leading causes of occupational death in Missouri are motor vehicle accidents, assaults and violent acts, contact with objects or machinery, falls, and electrocution.

Missouri industries with the highest number of fatal incidents are agriculture/forestry/fishing, construction, transportation/public utilities and service-oriented businesses.

Agriculture/forestry/fishing accounted for 20 fatalities in 1997 and remains a leading industry for workplace deaths. Tractor-related incidents were the leading contributor, with "being struck by the tractor during a rollover" the primary cause. Farmers using tractors to mow grass, pull stumps and pull logs out of the woods, were just some of the fatalities in this industry.

The **construction** industry had a total of 21 fatalities in 1997 ranging from falls from heights, struck by moving or falling objects, to electrocution. The most common type of fatality incident in construction is fall from height. Being struck by falling objects or by equipment is also common. Lack of workplace hazard awareness is one of the many causes of construction-related deaths.

The **transportation/public utilities** industry accounted for 22 fatalities in 1997. Persons working in this category are often truck drivers or electrical linemen working for the local utility company. Victims are usually involved in single or multiple motor vehicle accidents or electrocuted while working on an electrical line.

The **service** industry had 19 incidents in 1997, mostly related to motor vehicle accidents where the individual was in transit from one service call to the next. There are vehicle vs. train accidents, falls and electrocutions. Service workers face a large variety of dangers and should be aware of these hazards that exist around them.

The loss of a life is a tragic event. When a worker death could have been prevented, it makes the event even more tragic. Employers must provide a safe and healthful environment for their workers. Workers need to be trained on how to recognize known hazards and the proper avoidance techniques. The information learned from these incidents in the workplace must be put to use to prevent additional deaths. The MO FACE and CFOI programs exist to provide prevention information to employers and employees across the state of Missouri. Together, these programs can help eliminate worker deaths throughout the state.

* The 1997 rate was calculated using Current Population Survey employment data and is considered experimental.

Hazardous Substances Emergency Events Surveillance 1998 Annual Report*

Carol Braun
Peggy Fischer
Office of Surveillance

Case Definition for Hazardous Substance Release

A hazardous substance release is entered in the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; and
2. The substances that are actually released or threatened to be released include ALL hazardous substances except petroleum products; and
3. The quantity of the hazardous substances that are released, or are threatened to be released, need (or would need) to be removed, cleaned up, or neutralized according to federal, state or local law; or
4. Only a threatened release of hazardous substances exists, but this threat leads to an action such as an evacuation that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

The Hazardous Substances Emergency Events Surveillance (HSEES) program, established by the federal Agency for Toxic Substances and Disease Registry (ATSDR) in 1990, collects information on the direct public health impact of emergency events involving hazardous substances. Missouri's HSEES program receives notifications of incidents involving hazardous substances from several sources, including the Missouri Department of Natural Resources' Environmental Services Program, the United States Coast Guard's National Response Center, the federal Department of Transportation's Hazardous Materials Information System, the Missouri State Highway Patrol, and the media. Information about specific hazardous substance emergency events is obtained from the Missouri departments of Agriculture, Conservation, Public Safety, and Highway and Transportation, regional environmental agencies, local public health agencies, responders, incident commanders, responsible parties, facility and transportation managers, hospitals, employees, witnesses, and victims.

The Missouri HSEES program has completed its fifth year of data collection. As the program continues, new notification and data sources are explored, and information is shared and analyzed to determine the public health impact of emergency events involving the release of hazardous substances in the state. All Missouri HSEES data are transmitted to ATSDR for analysis with the data collected from the other 13 participating states. Personal/company identifiers are not transmitted to, or maintained by, ATSDR to protect the confidentiality of program participants.

Because the intent of the HSEES program is to reduce the morbidity and mortality related to hazardous substances emergency events, it is important that the public, emergency responders, employees and industries receive feedback from the program concerning case investigations. In those cases where development of intervention strategies might prevent similar future incidents, specific summary investigation reports are prepared and distributed to the community involved. When appropriate, health education programs to promote prevention strategies are conducted for the affected industry, local emergency planning committees, emergency responders, etc.

Analysis of Data on Hazardous Substances Emergency Events

In calendar year 1998, there were 196 incidents that met the hazardous substances emergency event case definition (see sidebar). Of this total, 192 events included actual releases of hazardous substances. Actual (not threatened) releases occurred in 161 (82.1%) events. Thirty-one (15.8%) involved both actual and threatened substance releases, and four events (2.0%) involved only threatened releases.

* Data provided in this report for 1998 are preliminary. This report was supported by funds from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) trust fund provided to the Missouri Department of Health under Cooperative Agreement Number U61/ATU780955-02 from the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.

Of the 192 events involving an actual hazardous substance release, the majority (187, or 97.4%) involved the release of only one substance and five (2.6%) involved the release of two substances. The most commonly released substance was ammonia and ammonia compounds, occurring in 35 (18.2%) events. Other commonly released substances and number of occurrences were acids or mixtures containing acids (30, or 15.6%) and mercury (12, or 6.3%).

Events were scattered throughout the state, occurring in 58 counties and the City of St. Louis. This represents 51.3 percent of the counties in the state. Events occurred primarily in counties where there are larger cities, interstate highways and large manufacturing or mining facilities. See Figure 1 for the number of events occurring in each county.

Of the total 196 events, 170 (86.7%) occurred on weekdays and 26 (13.3%) occurred on weekends. Actual number of events occurring by day of the week are: Sunday (13), Monday (39), Tuesday (34), Wednesday (42), Thursday (30), Friday (25), and Saturday (13).

Evacuations were ordered by an official in 23 (11.7%) events. Eighteen evacuations involved a total of 4,761 people. The number of people evacuated in five events is unknown. Thirteen evacuations involved a building or an affected part of a building, five evacuations were within a specified radius of a release, three evacuations were downwind, one evacuation was both within a specified radius and downwind, and one evacuation was made with no defined criteria for the evacuated area. One event, involving a tire fire and the release of an unknown quantity of magnesium, had the largest number of people evacuated. The close proximity of 3,000 gallons of propane and a 30,000 gallon tank of methanol, as well as air pollution from the burning tires, prompted the evacuation of approximately 3,000 people within a one-mile radius.

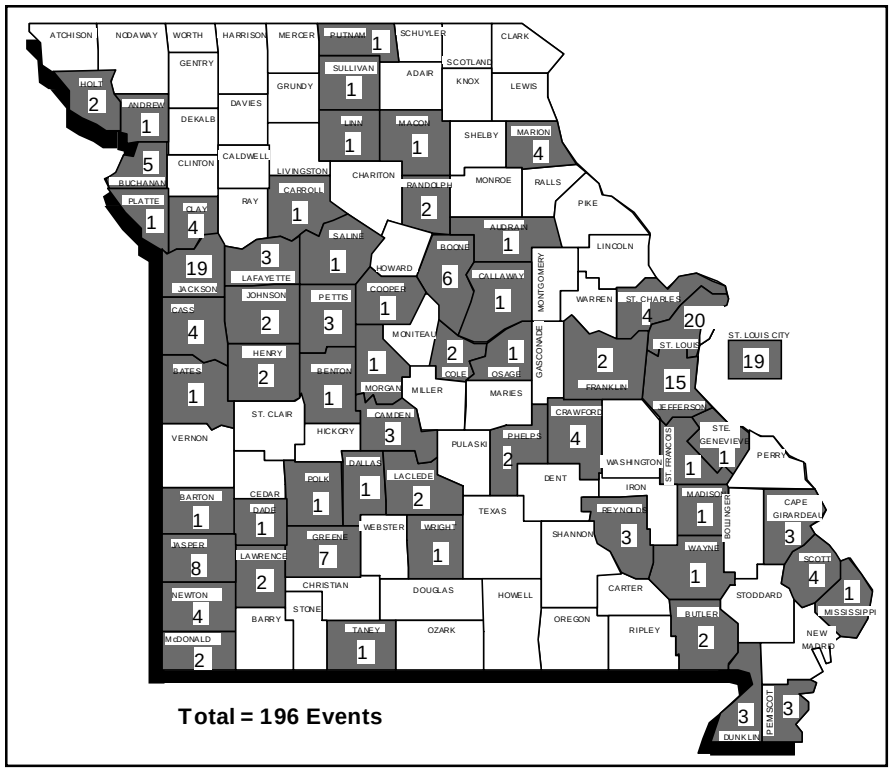


Figure 1. Location of non-petroleum hazardous substances emergency events by county, Missouri, 1998.

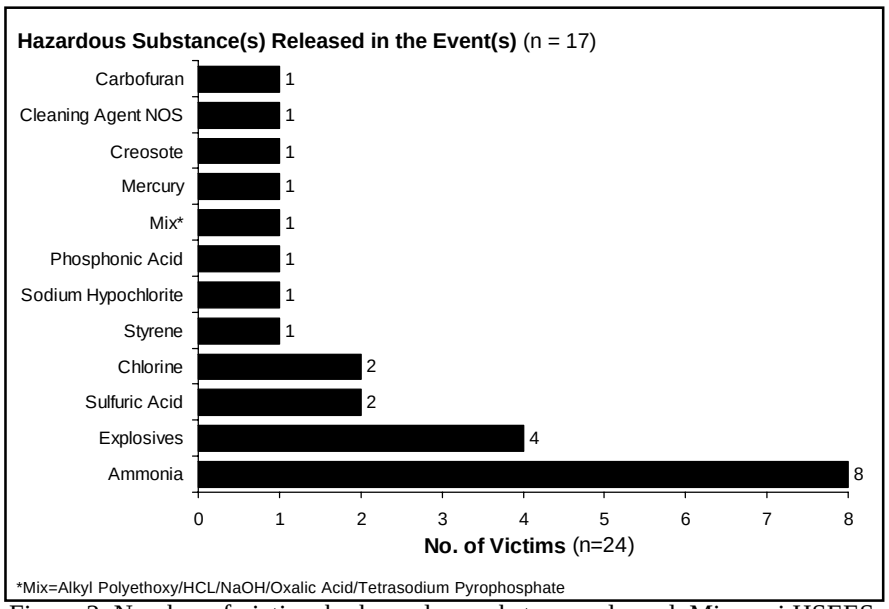


Figure 2. Number of victims by hazardous substance released, Missouri HSEES, 1998.

One hundred forty-five (74.0%) of the releases occurred in fixed facilities while 51 releases (26.0%) were transportation-related. Most of the fixed-facility releases (64, or 44.1%) were due to equipment failure, 39 (26.9%) were due to operator error, four (2.8%) were due to improper filling, overfill, and one (0.7%) was due to improper mixing of substances. Other factors contributed to releases in 26 (17.9%) events, and in the remaining 11 (7.6%) events, the cause or contributing factors were

(continued on page 24)

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unknown. Of the 51 transportation releases, 42 (82.4%) were ground transportation and nine were rail transportation. Fixed facility events resulted in 21 (87.5%) victims and transportation events resulted in three (12.5%) victims, with a total of 24 victims resulting from 17 events.

Seventeen (8.7%) releases involving 12 different substances (see Figure 2 on page 23) resulted in 24 persons with single or multiple injuries (40 total injuries). The largest number of victims associated with a release was four. The most common types of injuries reported were respiratory irritation (10), trauma (6), chemical burns (5), and eye irritation (4). Other injuries experienced included nausea/vomiting, thermal burns, headache, dizziness, chest pain, shortness of breath and elevated blood mercury level. See Figure 3.

Of the 24 victims, twenty were employees, one was a responder, one was a member of the general public, and two were professional fire fighters.

One person was treated at the scene of the event, 14 were treated at but not admitted to a hospital, seven were admitted to a hospital, and two people died.

The two deaths occurred at fixed facilities. An explosion of an unknown quantity of detonators at an explosive incinerator resulted in four employee victims, including one death. In a separate event, a death occurred when an employee mistakenly released a pressurized door of a wood treatment vessel. While only a small quantity of creosote was released, the trauma of the door striking another employee resulted in the death.

Reporting Events

The Missouri HSEES program is indebted to the Missouri Department of Natural Resources' Environmental Services Program for helping to investigate these hazardous substances

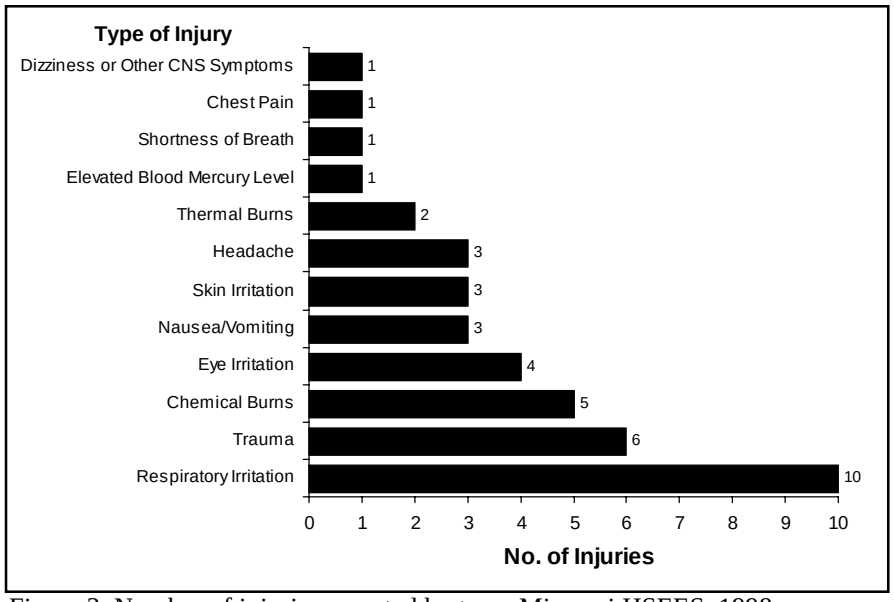

Figure 3. Number of injuries reported by type, Missouri HSEES, 1998.

emergency events. The program relies heavily on the Department of Natural Resources for notification of releases and frequently contacts them for circumstances surrounding a release.

If you are aware of an emergency event involving the release of non-petroleum, hazardous substances that may not have been reported to the Missouri Department of Natural Resources, please contact: Peggy Fischer, HSEES Coordinator, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 526-1686.

Section for Environmental Public Health

(continued from page 5)
participants in the study area and 74 participants in a comparison area. The second sampling was performed in July 1996, approximately four months after the incinerator began operation. Second-round blood samples were taken from 75 of the original 76 participants in the study area and from 70 of the original 74 participants in the comparison area. The third and final sampling was conducted June 19–24, 1997.

Analysis of study results showed no increase in blood-dioxin levels during the incinerator's operation in the study population (persons living near the incinerator) or in the comparison population (persons living away from the incinerator). In fact, blood dioxin levels in both populations decreased between the first and third samples. The average tetrachlorodibenzo-p-dioxin (TCDD) concentration in study area participants was 1.79 parts per trillion (ppt) in the first sampling and 1.34 ppt in the third round. In comparison, the average TCDD in the participants from the comparison area for the first and third rounds were 1.46 and 1.23 ppt, respectively. The study concluded that incineration of TCDD contaminated soil and other material at the Times Beach incinerator did not result in any measurable exposure to the population surrounding the incinerator as indicated by serum TCDD levels.

The draft report for public comment was released May 12, 1998. For more information, contact the section at (800) 392-7245.

Vaccine-Preventable Disease 1998 Annual Report

Susan Denny
Section of Vaccine-Preventable and Tuberculosis Disease Elimination

As the incidence of vaccine-preventable diseases in Missouri has continued to decline, the Section of Vaccine-Preventable and Tuberculosis Disease Elimination and the Office of Surveillance have intensified efforts to collect complete and accurate information on remaining cases. “The reason for collecting, analyzing, and disseminating information on a disease is to control that disease.”[1]

With accurate information on disease incidence, health care workers can ensure that vaccines are widely distributed in order to prevent, control and eliminate vaccine-preventable diseases. By analyzing information obtained on these cases, it will be possible to gain a better understanding of the factors that allow disease transmission despite high immunization rates.

“The occurrence of vaccine-preventable diseases in a community may be a sentinel event that signals the presence of an un- or underimmunized population within the community. Such populations may be small, access health care infrequently, or otherwise be difficult to identify.”[2]

The Section of Vaccine-Preventable and Tuberculosis Disease Elimination is responsible for surveillance of pertussis, diphtheria, tetanus, measles, mumps, poliomyelitis and rubella, as well as *Haemophilus influenzae* type b in children under age 15.

Surveillance of three other vaccine-preventable diseases, hepatitis A, hepatitis B and *H. influenzae* type b in adults, is conducted by the Section of Communicable Disease Control and Veterinary Public Health. Information on the incidence of those diseases can be found in the Communicable Disease 1998 Annual Report to be published in the July-August 1999 issue of the *Missouri Epidemiologist*.

The Office of Surveillance analyzes and disseminates surveillance data and provides consultation for disease intervention activities. Fazle Kahn of the Office of Surveillance coordinates efforts to enhance surveillance of vaccine-preventable diseases in the state. "As vaccine-preventable diseases become less prevalent, the role of surveillance has become more important," according to Kahn. Collecting and reporting complete and accurate information is essential in order to better understand how disease transmission continues.

In 1998, no cases of diphtheria, tetanus or polio were reported in Missouri. There were four cases of mumps, two of whom had been previously immunized. There was one case of measles in a 2-year-old girl who had been previously immunized; two cases of *H. influenzae* type b in children under age 1 who had not been immunized; and two cases of rubella in adult women for whom the immunization history is unknown.

In 1998, 59 cases of pertussis were reported in Missouri, compared to 80 cases in 1997 and 74 in 1996. Forty-seven of the 1998 pertussis cases (80%) were in children less than 1 year of age. Seven cases (12%) were in children between the ages of 1 and 5, and the remaining five cases (8%) were in persons over age 5.

Incomplete immunization coverage is not the only reason that cases of pertussis continue to occur. The Advisory Committee on Immunization Practices (ACIP) recommends an optimum of five doses of pertussis vaccine for children before the age of 7. But even if a person is fully immunized by 7 years of age, immunity eventually wanes. When immunity has waned, adolescents and adults can develop pertussis, which may be undiagnosed but can spread to infants and young children, who are at highest risk of serious illness. However, it is not recommended that persons over age 7 receive routine pertussis vaccination because adverse reactions to the vaccine are thought to be more frequent, and pertussis-associated morbidity and mortality decrease with age.

The Missouri Department of Health is working with both public and private health care providers to ensure that 90 percent of Missouri’s 2-year-olds are appropriately immunized. In addition, Missouri law requires that school-age children be protected from vaccine-preventable diseases. As the department works toward the goal of fully immunizing all children, good surveillance data will greatly enhance its ability to identify individuals and communities in which immunization rates need to be improved.

REFERENCES:

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The following annual reports, normally published in the May-June annual report issue, have been delayed and will be published in the July-August 1999 issue of the *Missouri Epidemiologist*:

- **1998 Outbreaks of Communicable Disease**
- **Communicable Disease 1998 Annual Report**
- **Sexually Transmitted Diseases and HIV/AIDS in Missouri - 1998**

Animal Rabies Surveillance - 1998

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Rabies activity in Missouri was detected at a slightly higher level, 42 cases, during 1998. See Figure 1. The number of cases increased by 35 percent or 11 cases from the 31 cases in 1997. The number of specimens tested in 1998 was 2,448, with 42 being positive; this is a 1.72 percent positivity rate. In 1997, there were 2,421 specimens tested with 31 positive, for a 1.28 percent positivity rate. This increase of four tenths of a percent in the positivity rate could be the signal for an increase of rabies activity. Historically, an increase in positivity precedes an increase in rabies incidence. From a low of 26 cases of rabies in 1996, the increase to 42 cases in 1998 represents a 61.5 percent increase. Since rabies is endemic in Missouri, cycles in species will fluctuate causing significant total number changes, which may represent an upcoming epidemic. Careful evaluation of all factors and constant vigilance is critical before trends can be predicted and appropriate control measures recommended.

Of the 42 total cases, more than half, 22 cases, were of the South Central skunk variant. This skunk variant spilled over into domestic animals, causing two cases each in the equine and canine species and one case in a feline. This same skunk variant caused one case of fox rabies.

All the skunk variant cases occurred within a four-county tier of the Arkansas border. Only nine of these southern Missouri counties actually reported cases of rabies. One of these counties reported a case of dog rabies; however, no rabies was reported in the wildlife reservoir in that county, possibly due to a lack of surveillance activities.

There were 14 cases of bat rabies scattered throughout the state, the majority involving the Big Brown Bat.

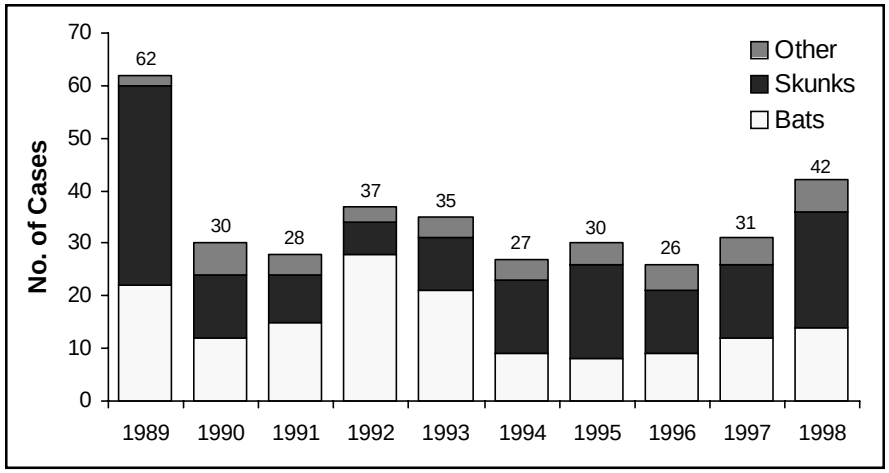

Figure 1. Confirmed animal rabies cases by year and species, Missouri, 1989–98.

This is one case below the 15 cases per year average for the past 11 years. Media coverage of bat rabies has caused undue anxiety in many communities. It should be stressed that there is not an epidemic of bat rabies in Missouri. On the national level, 46 out of 50 states reported rabies in bats. Only Alaska, North Dakota, Vermont and Hawaii (which is rabies free) did not report rabies in bats. Bat rabies incidence in the United States has fluctuated from 600 to 1,000 cases over the past 20 years. The percent of total animal rabies cases attributed to bats was 11.3 percent in 1997, the highest since 1989 when 15 percent of all rabies cases were attributed to bats. The bat strain of rabies was the cause of all four human cases of rabies in 1997 and approximately 80 percent of all human cases that were acquired in the United States and for which the source could be determined since 1980. This fact has contributed to a significant increase in the number of bat specimens (450) submitted for testing in Missouri and most likely in the nation. Although the national 1998 rabies data is not complete, at this point there have not been any cases of human rabies reported. Medical consultation should be sought after possible exposure to a bat.

A positive approach with aggressive public health measures must be followed to control and prevent rabies. Rabies vaccines with three years duration of immunity should continue to be used in domestic animals whenever such a vaccine is available. All dogs, cats and ferrets should be professionally vaccinated. The stringent policy of euthanasia of unvaccinated dogs or cats exposed to laboratory confirmed rabid animals must be continued to prevent additional cases and outbreaks of rabies. Collectively, all of these factors contributed to the low level of rabies incidence in Missouri over the last decade and a half. The ability to maintain low incidence levels may be tested when the raccoon rabies epidemic, now in Ohio and traveling west at 30 miles per year, reaches Missouri's borders.

Kansas State University identified the strain of rabies virus in each specimen that tested positive for rabies this year under a grant program received by that institution. All terrestrial cases of rabies from Missouri in 1998 are from skunk variants except for one canine isolate that could not be typed because of lack of positive staining. All skunk cases are from South Central variant, except for one sample from the Bootheel (New Madrid County) that was the North Central strain. Since there is a pocket of North Central strain in skunks in northern Arkansas, this finding is not surprising. These analyses do prove that the predominant rabies activity occurring in Missouri skunks is the South Central strain variety.

Cardinal Rules of Rabies Control

- All cats, dogs and ferrets should be vaccinated by a professional.
- A program of stray animal control should be instituted.
- Individuals should be instructed to stay away from wild and stray animals.
- **All** animal bites should be medically evaluated.

On the 1997 national picture (latest available data), animal rabies was up from 7,128 in 1996 to a total of 8,509 cases. Wild animals accounted for 7,899 cases or 93 percent of all rabies cases. Raccoons had the most cases with 4,300 (50.5%); skunks with 2,040 cases (24%); bats with 958 cases (11.3%); and foxes with 448 (5.3%). Other wild animals included 55 ground hogs, 53 mongooses, 18 bobcats, seven coyotes, five otters, five beavers, three rabbits, three opossums, two wolf-dog hybrids one squirrel and one muskrat. Domestic animal rabies was seven percent of the total with 610 cases. Of the domestic totals, cats had the most cases with 300 or 49.2 percent, dogs with 126 cases or 20.6 percent; cattle with 122 or 20.0 percent; and horses with 47 or 7.7 percent. Other domestics included 13 sheep/goats, one swine and one ferret.

Animal bites should be reported to your local public health agency or medical authority in Missouri. Evaluation of bites for possible post-exposure rabies treatment is one of the four cardinal rules of rabies control. See sidebar.

No therapy is effective for preventing death due to rabies infection after onset of clinical disease. Therefore, the focus of treatment must be on preventing the virus from reaching the central nervous system. Primary wound management, along with timely and proper administration of rabies immune globulin and vaccine, is essential. Patients should be evaluated for possible rabies post-exposure prophylaxis (PEP). Those indications are:

- Epidemiological evidence for need of PEP
- Patient clinical picture and history
  a. bite or scratch with infectious material penetrating intact skin
  b. contact with saliva/infectious material to wound or mucous membranes
- Reservoir wild animals, including bats, physically present, bite cannot be ruled out and rabies in the wild animal cannot be ruled out by testing.

LATE BREAKERS

☞ **Rubella Alert**—Nebraska and Iowa are experiencing outbreaks of rubella among Hispanic workers in meat processing plants. To date in 1999, Missouri has had two cases of rubella in Hispanic meat processing plant workers in Jasper County. We are asking physicians treating patients with rashes to consider rubella as a possible diagnosis, especially in Hispanic patients. All cases of rubella should be reported to your local public health agency or the Section of Vaccine-Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

☞ **New Immunization Recommendations**

Polio Immunization—The Advisory Committee for Immunization Practices (ACIP) proposes a change in the recommendation for routine childhood polio vaccination beginning in 2000. If the recommendation is accepted by CDC, all children will need to get four doses of inactivated poliovirus vaccine (IPV) at age 2, 4, 6–18 months, and 4–6 years beginning in January 2000. The committee recommends only the IPV to eliminate the occurrence of vaccine-associated paralytic poliomyelitis (VAPP) in the United States.

Varicella Immunization—The ACIP expanded its recommendations to include establishment of child care and school entry requirements by all states, use of the vaccine following exposure and for outbreak control, use of the vaccine for some children infected with the human immunodeficiency virus (HIV), and vaccination of susceptible adults and adolescents at high risk for exposure.

Influenza Immunization—The Food and Drug Administration's Vaccines and Related Biologic Products Advisory Committee (VRBPAC) recommends that the trivalent influenza vaccine prepared for the 1999–2000 season will include A/Beijing/262/95-like (H1N1), A/Sydney/5/97-like (H3N2), and B/Beijing/184/93-like hemagglutinin antigens. For the B/Beijing/184/93-like antigen, U.S. manufacturers will use the antigenically equivalent B/Yamanashi/166/98 virus because of its growth properties and because it is representative of currently circulating B viruses. The ACIP has also released its recommendations on the prevention and control of influenza for the 1999–2000 season.

The full text of the above ACIP recommendations is available through **http://www2.cdc.gov/mmwr/mmwr_rr.html**. If you have questions, please contact the Section of Vaccine-Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
www.health.state.mo.us

The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

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Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

Tick-Borne Disease

(continued from page 19)

Ehrlichiosis infections in Missouri total 154 human cases since 1988, or an average of 14 cases per year. Missouri continues to account for the majority of the ehrlichiosis cases reported nationally, with central Missouri being the epicenter. In 1998, 12 cases of ehrlichiosis were reported in Missouri.

Borreliosis is a serious vector-borne disease in the United States. Borreliosis is a general term which includes both Lyme and Lyme-like illness, as both are thought to be caused by *Borrelia* organisms. Ninety percent of all cases are reported from the northeastern United States. In 1998, there were 12 cases of borreliosis reported in Missouri that met the surveillance case criteria for Lyme disease set by the Centers for Disease Control and Prevention and the Council of State and Territorial Epidemiologists.

The number of cases of tick-borne diseases fell below the five, ten and 15 year averages in 1998. It is possible that all tick-borne diseases are at a natural low ebb, but the decline in the number of reported tick-borne diseases in Missouri may also represent a flaw in the surveillance system.

Why Reporting is Important

Disease surveillance cannot be accomplished by any single group. In essence, it is the compilation of contributions by the patient, the health care provider (both physicians and veterinarians), the hospital and medical community, and the local, state and national public health agencies.

Disease reporting is an important component of health care. Analyzing disease occurrence, the characteristics of the disease and its effect on the population can protect the community. Knowing geographically where specific diseases are occurring and in what populations is important information for prevention. This information also alerts physicians and other providers to new or emerging diseases that may be appearing in their patient populations. Vector-borne diseases recognized in a specific location can be controlled to prevent further disease spread. See Table 1 on page 19 for criteria to be used when reporting tick-borne diseases.

For additional information regarding the symptoms, causative organism and transmission of tick-borne diseases in Missouri, see the 1997 Tick-Borne Disease Summary in the May-June 1998 issue of the *Missouri Epidemiologist.*